CERAMICS FROM THE WHELAN SITE: A TEMPORAL AND FUNCTIONAL ANALYSIS

OF A LATE CADDOAN MOUND SITE ASSEMBLAGE

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CERAMICS FROM THE WHELAN SITE: A TEMPORAL AND FUNCTIONAL ANALYSIS
OF A LATE CADDOAN MOUND SITE ASSEMBLAGE

BY

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THESIS

Presented to the Faculty of the Graduate School of
The University of Texas at Austin
in Partial Fulfillment
of the Requirements
for the Degree of

MASTER OF ARTS

THE UNIVERSITY OF TEXAS AT AUSTIN

December 1984

ACKNOWLEDGEMENTS

There are numerous people to thank for their assistance in the preparation of this thesis. First and foremost is Dee Ann Story, my major advisor. Her ideas and encouragement guided the development of this project from its inception through the final draft. My thanks also go to E.Mott Davis, my second reader and chief grammarian. I'm especially appreciative of his support for the critical aspects to this study.

Several colleagues deserve thanks for their technical expertise and assistance in preparing portions of this thesis:

-- Cynthia Banks and Uli Kleinschmidt for photographic help and advice;

-- Carol Vernon for drafting several figures and advice in the planning and execution of others;

-- Tammy Stone for demonstrating how to use a polarizing microscope;

-- Carolyn Spock for editorial assistance in both text and figures;

-- Joanne Spero for help in xeroxing.

Special thanks are due Carol Vernon for typing part of the bibliography and Carolyn Spock for typing a majority of this thesis. The overall contributions of these two women greatly facilitated and improved the quality of my finished product.

Although the ideas contained herein are attributable to me, I have benefitted from conversations with these colleagues: David Brown, Ross Fields, Jan Guy, Uli Kleinschmidt, Mike Pool, Tammy Stone, Kate Sullivan and A.J. Taylor.

I gratefully acknowledge Pete Thurmond's permission to use several of the figures from his thesis.

A final word of thanks goes to my #1 supporter - Kevin Johnston, who renewed the overdue library books, made me dinner and generally kept me going during the completion of this thesis.

ABSTRACT

The vessel ceramics from the Whelan site, a Late Caddoan mound center in northeast Texas, are analyzed to determine the site's temporal placement and the functional implications of an assemblage from a ceremonial site. The first goal is handled through a typological study; the second is accomplished by a functional analysis of vessel batches, from which specific vessel shapes, size classes and inferred activities are determined. Intrasite activity differences are suggested by the distribution of these vessel batches. Intersite comparisons with other Late Caddoan mound sites reveal ceramics functionally similar to Whelan and suggest that cooking and storage were important activities at these sites.

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Chapter 1

INTRODUCTION

This thesis presents an intrasite analysis of the ceramics from the Whelan site (41MR2), a Late Caddoan mound center on Cypress Creek in northeast Texas. The principal issues addressed are 1) the temporal placement of the site and 2) the nature of the cultural activities represented by the ceramic assemblage from a ceremonial site.

The 13,143 sherds comprising the collection came from excavations carried out in 1957 as part of the Ferrell's Bridge Reservoir salvage project. The collection was described initially by the excavator of the site, E. Mott Davis, in an unpublished preliminary report (1958).

Subsequently, five other mound sites with similar artifacts and features were investigated in the reservoir. Enough similarities were evident among these sites that a cultural grouping - initially called the Whelan Complex (Davis and Gipson 1960), and more recently termed the Whelan Phase (Thurmond 1981) - was recognized. Of particular importance in defining the complex was the Whelan site with its abundant and diverse artifact assemblage, and its evidence of both mound and non-mound structures. Moreover, Whelan was the largest and least disturbed of the Whelan Phase sites. A recent synthesis of the cultural history of the Cypress Basin (Thurmond 1981) has emphasized the need for a restudy of the material from the Whelan site to confirm the discreteness of the Whelan Phase, which has been questioned by Bruseth and Pertulla (1981).

Reanalysis of the Whelan site ceramics is facilitated by the size of the collection and good provenience data. The number of sherds from the Whelan site is greater than the combined totals from the five other Whelan Phase mound sites. Particularly notable are the large samples from mound and non-mound features, and from stratified mound contexts. The mound/non-mound specimens are useful for examining possible intrasite differences in the activities carried out at this site; while the sherds from the one extensively excavated, stratified mound provide the best test for possible temporal variation within the site.

This thesis is divided into nine chapters. Chapter 2 begins with the environmental background for the Cypress Basin, followed by a history of the investigations that concentrates on the survey, testing and excavations carried out prior to construction of the Ferrell's Bridge Reservoir.

Chapter 3 summarizes the cultural chronology of the western and eastern portions of the Cypress Basin, based largely on Thurmond's (1981) systhesis. Particular attention is given to a discussion of the Late Caddoan period, and the controversy over the validity of the Whelan Phase.

Chapter 4 focuses on the Whelan site, beginning with a brief review of the earlier investigations. Excavation strategy, methods and results are considered in light of previous and current research aims. New stratigraphic interpretations are provided, and the classification of the Whelan site as a ceremonial center is reassessed.

Chapter 5 provides the theoretical background, by reviewing the literature pertaining to the function of ceramic vessels, beginning with general studies and concluding with those specific to the Caddoan area.

The rationale for the thesis is presented, along with a brief description of the methods used in the functional analysis.

Chapter 6 handles both the sherd and vessel batch analysis. First the sherd collection is described in terms of decorative technique and type. A detailed typological assessment provides the information necessary to place Whelan in a cultural context, and to refine its temporal placement. The vessel batches are then characterized in terms of functional attributes. Shapes, sizes and functions of vessels within the assemblage are discussed to infer the overall activities possibly represented at the site.

After a brief discussion of the site's integrity, Chapter 7 examines the intrasite distribution of the vessel batches to assess intrasite chronology and possible discrete intrasite activity areas.

Chapter 8 then presents the intersite comparisons of ceramic assemblages from other Late Caddoan mound sites. The thesis concludes with an overall summary and suggestions for new directions in future research presented in Chapter 9.

Following the final chapter, three appendices are included: Appendix I explaining the terminology used in the vessel batch analysis, Appendix II consisting of the raw data for the vessel batch analysis described in Chapter 6 and Appendix III providing the mathematical formulae for the statistical tests (chi-square and Pearson's contingency coefficient) run in Chapter 7.

Chapter 2

ENVIRONMENTAL AND ARCHAEOLOGICAL BACKGROUND

A review of the environment and archaeology of the Cypress Basin provides background data essential to the interpretation of the Whelan site. All of the known Whelan Phase sites are found along Cypress Creek, and most are within the Ferrell's Bridge Reservoir area. The basin also contains many of the Bossier and Belcher Focus sites with which the Whelan Phase sites are frequently compared. For these reasons, the Cypress Creek Basin constitutes a convenient study unit.

Thurmond's (1981) M.A. thesis, which synthesized the natural environment and the information pertaining to 476 archaeological sites in the Cypress Basin, is the primary source for the following summary.

Natural Environment of the Cypress Basin

Cypress Creek is a major western tributary to the Red River, flowing more than 200 kilometers through northeast Texas and northwest Louisiana. Figure 1 shows the relationship of Cypress Creek to the Red River and to other major drainages. An arrow indicates the location of the Ferrell's Bridge Reservoir (today called Lake o' the Pines).

Figure 2 pictures the modern features (lakes, towns and highways) within the Cypress Basin. One inset shows the location of the basin relative to state boundaries and the other identifies the counties/parishes which at least in part fall within the Cypress drainage.

The basin is located on the northwest margin of the West Gulf

FIGURE 1

REGIONAL CONTEXT OF THE CYPRESS BASIN

Arrow shows location of Lake o' the Pines.

FIGURE 1. Regional Context of the Cypress Basin

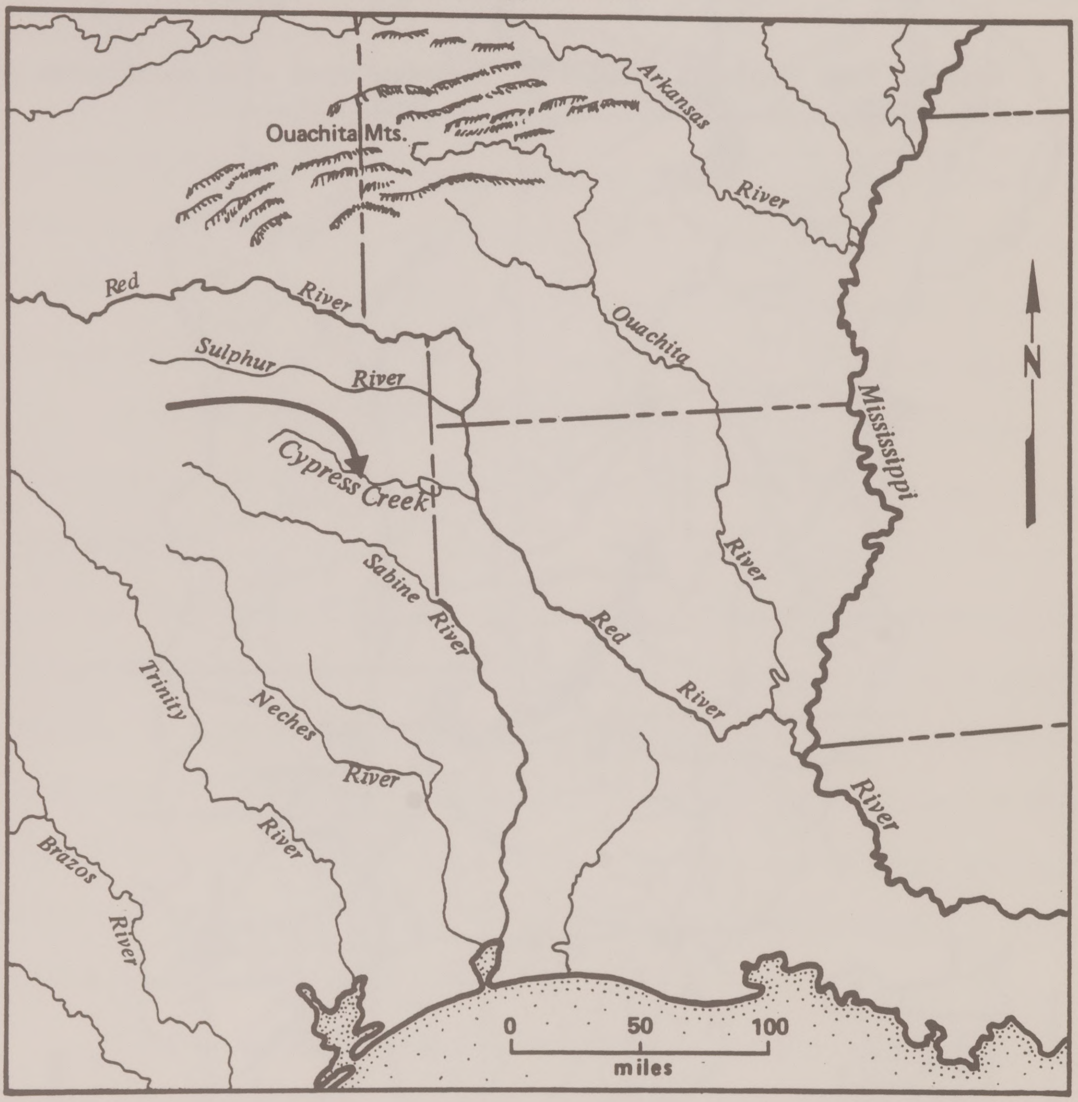
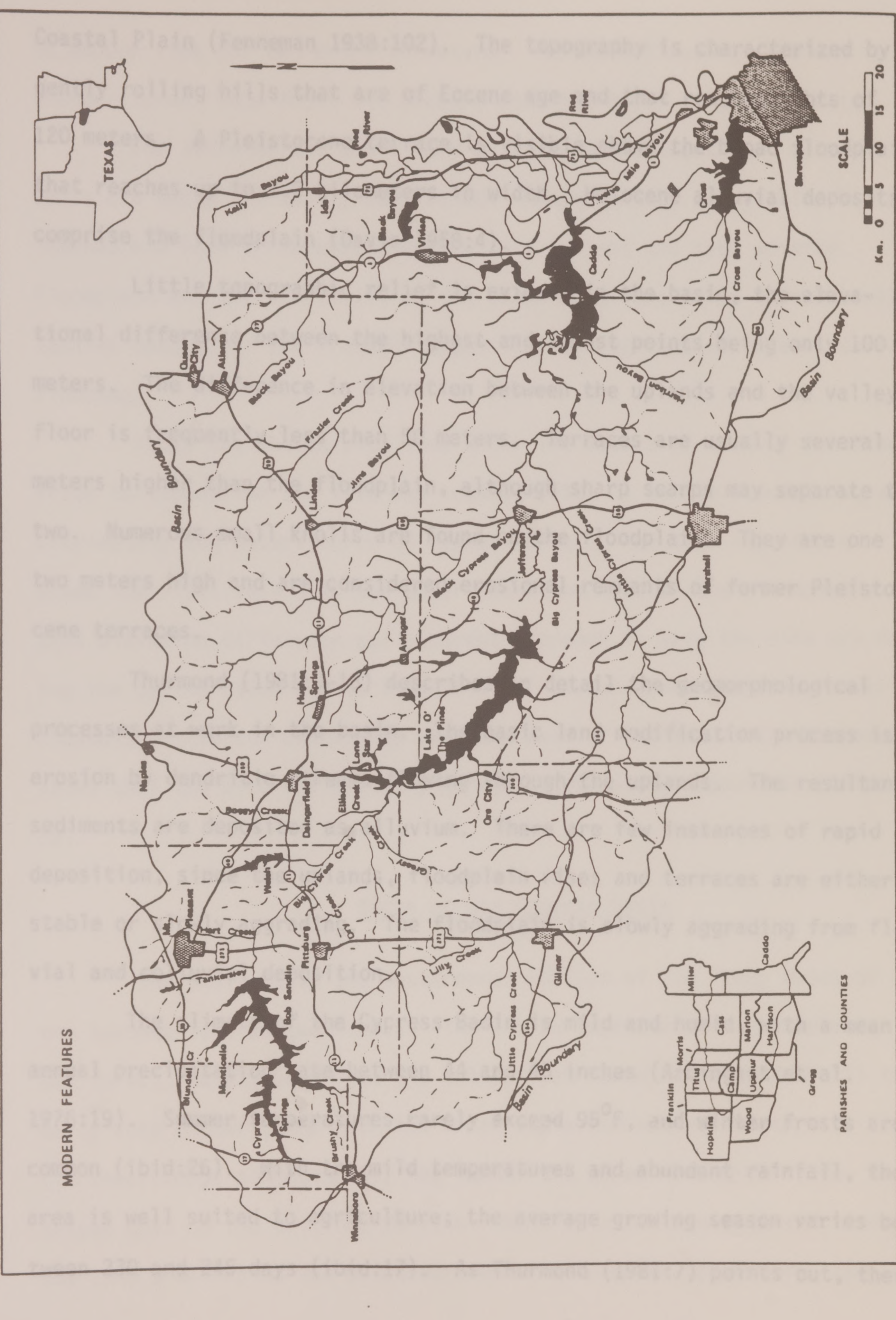


FIGURE 2

MODERN FEATURES OF THE CYPRESS BASIN

Adapted from Thurmond (1981:Fig. 1); reprinted with permission of the author.


MODERN FEATURES
TEXAS
SCALE
Km. 0 5 10 15 20
N
Red River
Kelly Bayou
Black Bayou
Vivian
Twelve Mile Bayou
Caddo
Cross
Cross Bayou
Shreveport
Queen City
Atlanta
Black Bayou
Frazier Creek
Jims Bayou
Linden
Basin Boundary
Black Cypress Bayou
Jefferson
Big Cypress Bayou
Little Cypress Creek
Marshall
Hughes Springs
Avinger
Lake O' The Pines
Lone Star
Naples
Daingerfield
Ellison Creek
Ore City
Boggy Creek
Big Cypress Creek
Pittsburg
Mt. Pleasant
Hart Creek
Lilly Creek
Gilmer
Tankersley
Bob Sandlin
Monticello
Blundell Cr.
Cypress Springs
Brushy Creek
Winnsboro
Little Cypress Creek
Basin Boundary
Miller
Caddo
Cass
Marion
Harrison
Morris
Titus
Camp
Upshur
Franklin
Hopkins
Wood
Gregg
PARISHES AND COUNTIES

Coastal Plain (Fenneman 1938:102). The topography is characterized by gently rolling hills that are of Eocene age and that reach heights of 120 meters. A Pleistocene terrace is visible above the broad floodplain, that reaches up to 3.2 kilometers in width. Holocene alluvial deposits comprise the floodplain (Davis 1958:4).

Little topographic relief is evident in the basin, the elevational difference between the highest and lowest points being only 100 meters. The difference in elevation between the uplands and the valley floor is frequently less than 50 meters. Terraces are usually several meters higher than the floodplain, although sharp scarps may separate the two. Numerous small knolls are found on the floodplain. They are one or two meters high and are considered erosional remnants of former Pleistocene terraces.

Thurmond (1981:9-13) describes in detail the geomorphological processes at work in the basin. The basic land modification process is erosion by dendritic streams flowing through the uplands. The resultant sediments are deposited as alluvium. There are few instances of rapid deposition, since the uplands, floodplain rises and terraces are either stable or slowly aggrading. The floodplain is slowly aggrading from fluvial and colluvial deposition.

The climate of the Cypress Basin is mild and humid, with a mean annual precipitation rate between 44 and 48 inches (Arbingast et al. 1976:19). Summer temperatures rarely exceed 95°F, and winter frosts are common (ibid:26). With the mild temperatures and abundant rainfall, the area is well suited to agriculture; the average growing season varies between 230 and 245 days (ibid:17). As Thurmond (1981:7) points out, there is enough time for two crops to mature. Periodic flooding, violent thunderstorms, late frost and drought pose the major farming threats.

The soils of the basin vary by topographic location. Upland soils are sandy and easily cultivated. However, they are usually badly leached and have a corresponding low base content and high acidity. Floodplain and terrace soils, on the other hand, are prime agricultural locales because of the frequent deposition of nutrient-rich soils during flooding.

Today the Whelan site lies under the waters of Lake o' the Pines. Prior to inundation the site was located (Fig. 3) on the floodplain, approximately 200 meters north of Cypress Creek. The site lay atop a broad low rise, less than one meter above the rest of the floodplain; this elevation difference was apparently enough to keep the site dry during the spring rains (Davis 1958:12-13). Sloughs, representing former channels of Cypress Creek, lay east and west of the site. Davis speculates that the site was probably on the creek during occupation (ibid: 12).

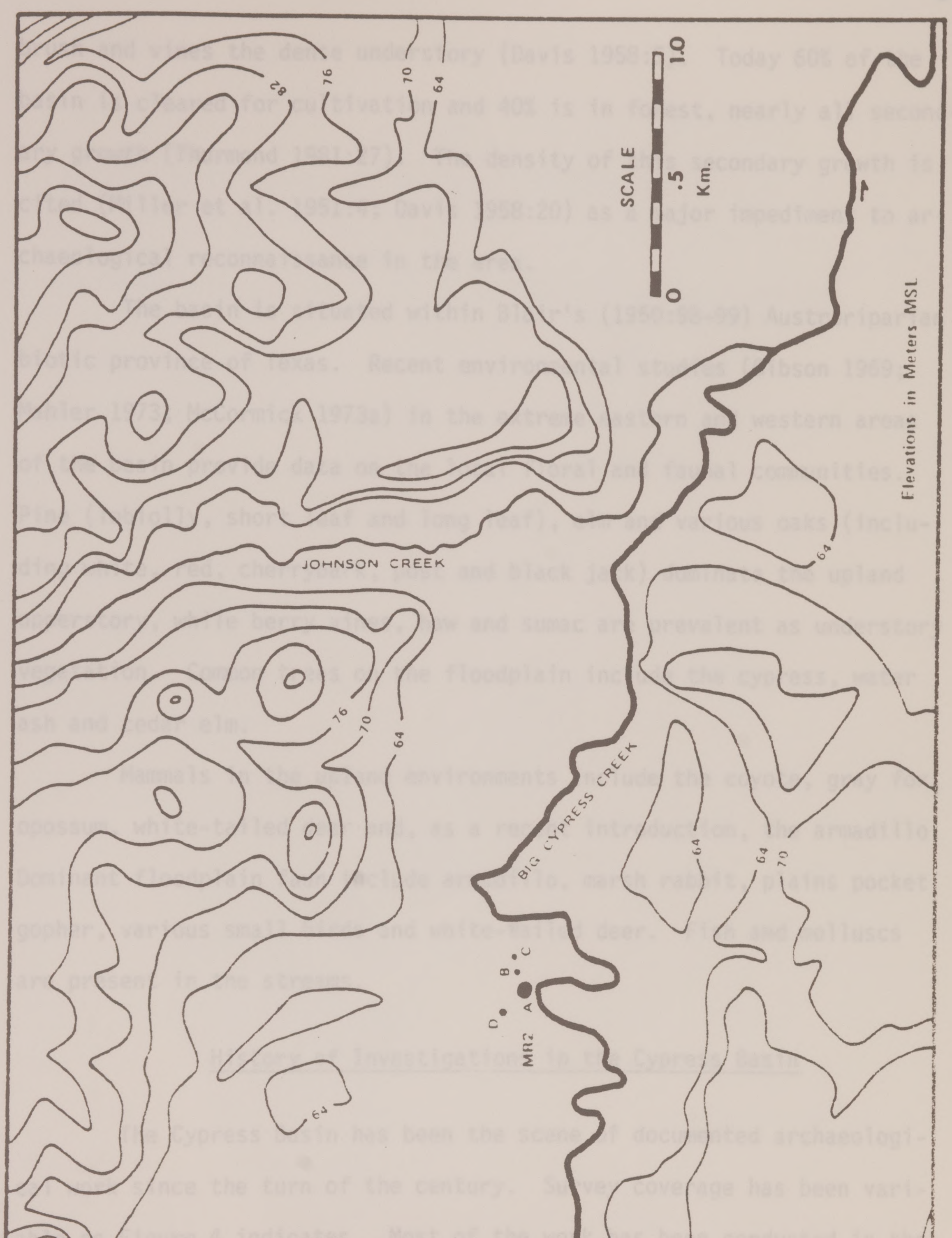
Biota of the Cypress Basin

The basin is in the westernmost portion of the Piney Woods of the Southeastern United States. The native vegetation in the uplands was forest, mainly oak-pine; the valleys had mixed hardwoods. Until the early 20th century, the forested areas contained native growth with little understory; subsequently, the lumber and paper industries have destroyed most of the original forests. Reforestation has occurred since the 1940's with pine and mixed hardwoods forming the upperstory, and

FIGURE 3

TOPOGRAPHIC LOCATION OF THE WHELAN SITE (41MR2)

Adapted from Thurmond (1981:Fig. 21); reprinted with permission of the author.


SCALE
0
.5
1.0
Km
Elevations in Meters MSL
82
76
70
64
JOHNSON CREEK
BIG CYPRESS CREEK
MR2
A
B
C
D
N

brush and vines the dense understory (Davis 1958:5). Today 60% of the basin is cleared for cultivation and 40% is in forest, nearly all secondary growth (Thurmond 1981:27). The density of this secondary growth is cited (Miller et al. 1951:4; Davis 1958:20) as a major impediment to archaeological reconnaissance in the area.

The basin is situated within Blair's (1950:98-99) Austroriparian biotic province of Texas. Recent environmental studies (Gibson 1969; Mahler 1973; McCormick 1973a) in the extreme eastern and western areas of the basin provide data on the local floral and faunal communities. Pine (loblolly, short leaf and long leaf), elm and various oaks (including white, red, cherrybark, post and black jack) dominate the upland upperstory, while berry vines, haw and sumac are prevalent as understory vegetation. Common trees on the floodplain include the cypress, water ash and cedar elm.

Mammals in the upland environments include the coyote, gray fox, opossum, white-tailed deer and, as a recent introduction, the armadillo. Dominant floodplain faun include armadillo, marsh rabbit, plains pocket gopher, various small birds and white-tailed deer. Fish and molluscs are present in the streams.

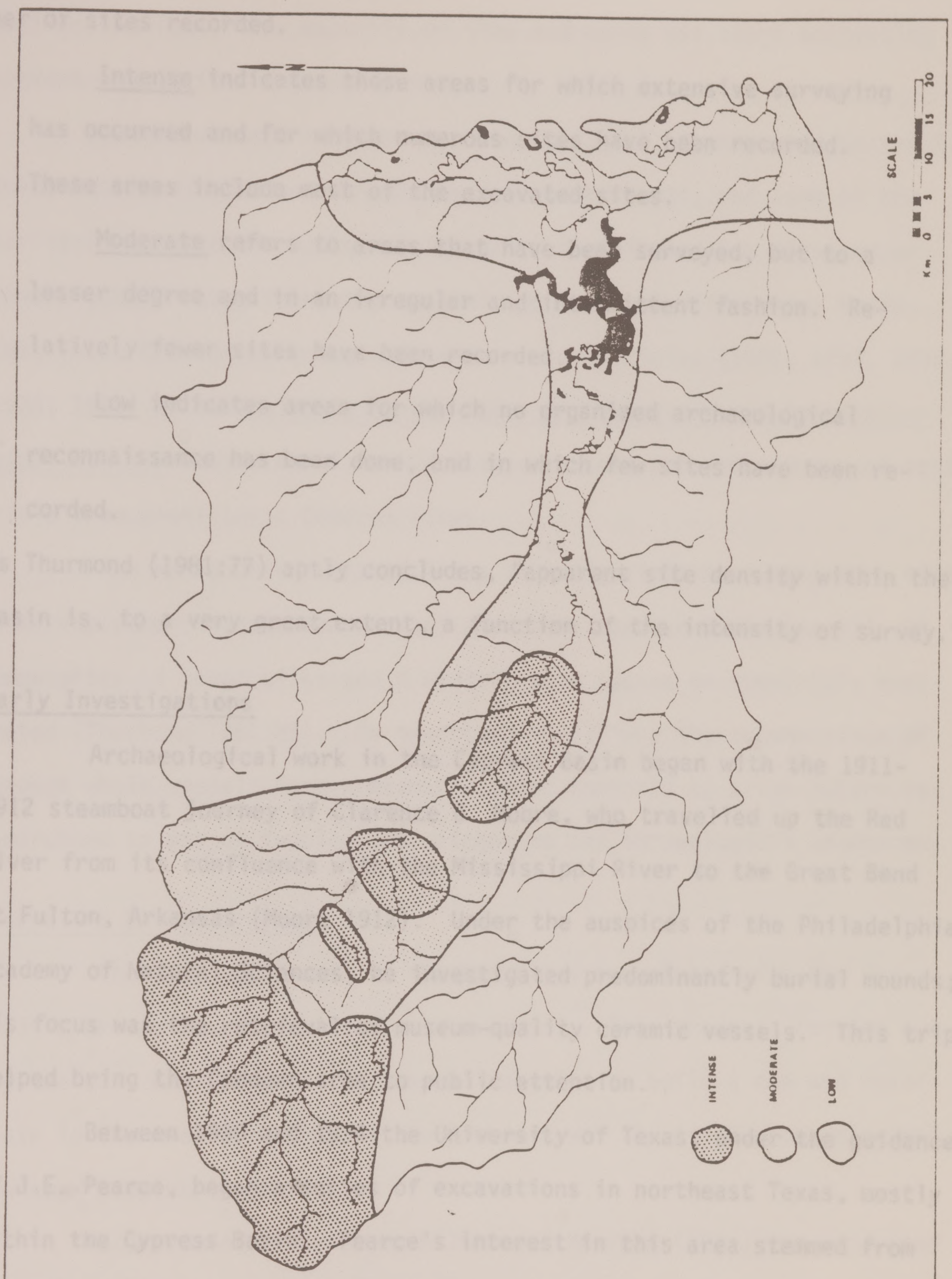
History of Investigations in the Cypress Basin

The Cypress Basin has been the scene of documented archaeological work since the turn of the century. Survey coverage has been variable as Figure 4 indicates. Most of the work has been conducted in the central and western reaches of the basin because of reservoir construction. The degree of coverage refers to the intensity of survey and num-

FIGURE 4

RELATIVE INTENSITY OF INVESTIGATION IN THE CYPRESS BASIN

Adapted from Thurmond (1981:Fig. 5); reprinted with permission of the author.


N
SCALE
Km 0 5 10 15 20
INTENSE
MODERATE
LOW

ber of sites recorded.

> Intense indicates those areas for which extensive surveying has occurred and for which numerous sites have been recorded. These areas include most of the excavated sites.
>
> Moderate refers to areas that have been surveyed, but to a lesser degree and in an irregular and intermittent fashion. Relatively fewer sites have been recorded.
>
> Low indicates areas for which no organized archaeological reconnaissance has been done, and in which few sites have been recorded.

As Thurmond (1981:77) aptly concludes, "apparent site density within the basin is, to a very great extent, a function of the intensity of survey."

Early Investigations

Archaeological work in the Cypress Basin began with the 1911-1912 steamboat journey of Clarence B. Moore, who travelled up the Red River from its confluence with the Mississippi River to the Great Bend at Fulton, Arkansas (Moore 1912). Under the auspices of the Philadelphia Academy of Natural Sciences, he investigated predominantly burial mounds; his focus was the retrieval of museum-quality ceramic vessels. This trip helped bring the Caddoan area to public attention.

Between 1930 and 1934 the University of Texas, under the guidance of J.E. Pearce, began a series of excavations in northeast Texas, mostly within the Cypress Basin. Pearce's interest in this area stemmed from several earlier reconnaissance trips. Like Moore, the aim of these early University of Texas investigations was the recovery of artifacts to augment collections. The majority of time and money was spent excavating Caddoan mound sites and cemeteries.

Numerous field reports were prepared; A.T. Jackson and Walter R. Goldschmidt provided some of the best field accounts, and some of the earliest interpretive works. Goldschmidt contributed the first major report (1935) recognizing the spatial and temporal differences among East Texas Caddoan ceramics. Jackson's many articles (1933, 1934, 1935, 1938, 1941) in the Bulletin of the Texas Archeological and Paleontological Society consisted of detailed descriptions and comparisons of materials from prehistoric Caddoan sites.

The early University of Texas investigations excavated more sites than any other institution working along the Cypress Basin; in all, 18 cemeteries, 4 mound sites and 8 middens were tested or completely excavated (Thurmond 1981:52). An important result was the accumulation of enough whole vessels from presumably tight contexts to allow future researchers to set up typological categories and chronological sequences.

Ferrell's Bridge Project

The next major work in the basin was associated with the Ferrell's Bridge Reservoir (Lake o' the Pines). This project, carried out by the U.S. Army Corps of Engineers' decision to build a dam and reservoir in the middle reaches of the Cypress, was the first archaeological salvage project in the basin.

A preliminary survey by Miller and Moorman (1951) was conducted by the River Basin Surveys under a joint agreement with the National Park Service and the Smithsonian Institution. Because 70% of the project area was densely wooded, the two-man survey crew relied mainly on contacting local informants and visiting accessible locales. The entire survey was done intermittently over a four-week period. Ultimately 31 sites were located and one previously recorded site was revisited.

An additional reconnaissance, performed by W.A. Davis intermittently between 1957 and 1960, recorded 33 new sites. From the combined survey inventories, recommendations for further site investigation were made. Consequently, 24 sites were tested, 5 were partially excavated and 1 was completely excavated, all under the supervision of E. Mott Davis and Edward B. Jelks. Investigated were the Late Caddoan mound sites of Whelan (Davis 1958), Sam Roberts (Tunnell 1959), Harroun (Jelks and Tunnell 1959), Dalton (Davis and Gipson 1960), and Segal (Davis 1961); a Late Caddoan cemetery at the McKinney site (Davis and Golden 1960) and a preceramic site, Jake Martin (Davis and Davis 1960).

In sum, the Ferrell's Bridge Reservoir Project resulted in the recording of 64 sites in an area of 155 square kilometers (Thurmond 1981: 55). A greater emphasis was placed on intensive excavation than on extensive surveying. Consequently, an excellent data base was generated for intra- and intersite studies. Furthermore, the excavations at the mound sites yielded valuable chronological data for the local manifestation of a new cultural entity, the Whelan Complex.

Recent Investigations

Subsequent to the Ferrell's Bridge Project, the major impetus for archaeological investigation in the Cypress Basin continued to be reservoir projects. Southern Methodist University was responsible for most of this work.

The one major project affecting the middle to eastern reaches of the Cypress was the Caddo Lake Enlargement, mitigated by survey around the perimeter of the lake (Gibson 1969). By contrast, the western portion of the basin received appreciably more archaeological attention because of the mitigation of several reservoirs. Lake Swauano (now called Welsh Reservoir) was surveyed by McCormick (1973b); no further work was done despite recommendations for testing. Lake Cypress Springs (Hsu et al. 1969) and the combined area of Lakes Bob Sandlin and Monticello were surveyed by a joint team from Southern Methodist University and the Texas State Building Commission. No further work was conducted in the Lake Cypress Springs area, but both an environmental survey (McCormick 1973a) and testing (McCormick 1974) comprised the work at Lake Monticello. The Lake Bob Sandlin area was tested by Sullivan (1975); subsequently, several sites within this reservoir were investigated by other groups.

Another large-scale project along the Cypress involved the Corps of Engineers' plans to build a navigation channel between Daingerfield, Texas and the Mississippi River. The environmental and archaeological impacts were assessed by Gulf South Research Institute (1974). This report provided valuable documentation for a poorly surveyed area between Caddo Lake and the Ferrell's Bridge area.

Numerous small-scale investigations have been conducted within the last 20 years in the Cypress Basin. The Texas Department of Highways and Public Transportation has tested sites in rights-of-way (Bell 1980;

Luke 1978; Wier 1971, 1973; Young 1981). A proposed state park in the Lake Bob Sandlin area necessitated the testing of one site (41TT310) and an archival search to assess the site's potential for being the location of an historic fort (Prikryl et al. 1984).

Several field schools have excavated Cypress Basin sites. A Texas Archeological Society Field School worked at 41CP110 (Woodall 1967), while in 1978 The University of Texas at Austin Field School partially excavated and tested Benson's Crossing (41TT110), a site now inundated by Lake Bob Sandlin. Several theses (Flaigg 1982; Driggers, in progress) present artifact analyses from the Benson's Crossing site. Activities at The University of Texas field school also included a limited survey, recording 25 sites and visiting 26 previously recorded ones (Thurmond 1981:69).

Of the individuals involved in the Cypress Basin, one - Clarence H. Webb - is particularly outstanding for the volume and caliber of his work. An avocational archaeologist for more than 50 years, Webb is well known for his work at Belcher Mound (1959), a stratified site upon which much of the chronology of the eastern Cypress Basin is based. Other notable contributions by Webb include site reports (Webb 1945, 1963; Webb and Dodd 1939; Webb and McKinney 1975; Webb et al. 1969) and areal syntheses (Webb 1941, 1948, 1960, 1961, 1983).

Other individuals active in Cypress Basin investigations include Robert L. Turner, whose work has focused upon Titus Phase cemeteries (Turner 1978). Milton Bell and Kenneth M. Brown recorded and tested sites in the western edge of the basin (Brown 1975). Along with Turner, they have provided a data base for the area between the Ferrell's Bridge

Reservoir and the Bob Sandlin/Monticello/Cypress Springs area.

Probable areas of future archaeological work include the proposed Black Cypress and Marshall dams, both planned by the Corps of Engineers on tributaries of Cypress Creek. Each dam would be approximately the same size as the Ferrell's Bridge Dam, and would impact sections of the Cypress Basin for which no current archaeological information exists. A preliminary environmental assessment, prepared by Environment Consultants, Inc. (Northern and Skiles 1981), recommends a 100% survey with shovel testing, as well as extensive mitigation of sites prior to reservoir construction. Currently, these projects are still in the planning stages (Robert F. Scott, personal communication 1984).

Summary

The environment of the Cypress Basin provides a context within which to study the Whelan site. The major environmental impediment to all phases of archaeological work has been the dense vegetation, particularly along the floodplain. Seventy years of archaeological investigation in the Cypress Basin have resulted in variable coverage. Two major bodies of data were collected: one by the University of Texas excavations in the 1930's and the other during the Ferrell's Bridge Project in the 1950's and 1960's. Of these two, the latter carried the additional value of defining a local cultural manifestation, the Whelan Complex.

Chapter 3
CHRONOLOGY

Since the 1940's. several chronologic frameworks have been developed for the Caddoan area, each a refinement of the pre-existing ones. In general, the schemes defined units that were as discrete temporally and spatially as possible. Continued research is necessary to develop and clarify local chronologies, such as the one presented by Thurmond (1981) for the Cypress Basin. His chronology is the most recent analysis of Cypress Basin data, and is discussed here after a review of several of the more broadly framed chronologies that have been proposed for the Caddoan area.

Regional Chronologies

The first major chronology for the Caddoan area (Krieger 1944a, 1946) was developed within the framework used by the Midwestern Taxonomic System. To dispel the notion that the Caddoan area was occupied "by a single group of people with a single archaeological complex" (Krieger 1944:154), Krieger presented a temporal scheme with two broad divisions: the Gibson Aspect (early Caddoan) and the Fulton Aspect (late Caddoan). Twelve temporal and spatial manifestations, called foci, were recognized on the basis of differences in ceramic design and shape, house and burial patterns, mound construction and other material traits. Krieger's chronology was focused only on the Caddoan periods, and did not handle pre-Caddoan cultures.

As more data were collected and analyzed, refinements were necessary. Suhm, Krieger and Jelks (1954) compiled the growing body of archaeological data, and expanded the number of definable foci to 16 of relevance to northeast Texas. Detailed trait lists associated with each foci were presented, all fitting into Krieger's original Gibson and Fulton Aspects. Both pre-Caddoan (i.e., Paleo-Indian and Archaic periods) and post-Caddoan (historic) periods were included.

In 1958 at the Fifth Caddo Conference, a five-part Caddo temporal sequence was presented by Webb (E. Davis 1961:136-137) as a more accurate reflection of the current data. The stratigraphic divisions in sites such as Belcher Mound provided the basis for Webb's scheme. By the early 1970's, several researchers (Davis 1970; Wyckoff 1971) had set up versions of Webb's sequence, giving Roman numerals to the units (Table 1). Caddo I and II corresponded to the Gibson Aspect, while Caddo III - V corresponded to the Fulton Aspect. Spatially discrete foci comprised each temporal division. Pre-Caddoan components were recognized, but were not included within the sequence. Of the three schemes presented in Table 1, Wyckoff's framework is the most useful for regional comparisons because his divisions are correlated with radiocarbon dates and his scheme encompasses the entire Caddoan area.

Story (1981) furnished a broad chronologic model for East Texas, incorporating both pre-Caddoan and Caddoan periods in the scheme. Four prehistoric divisions were presented: Paleo-Indian (10,000 - 6000 B.C.), Archaic (6000 - 200 B.C.), Early Ceramic (200 B.C. - A.D. 700) and Late Prehistoric (A.D. 700 - 1700). The dates for these periods are arbitrary, and separation is based on evidence for technological or subsis-

TABLE 1

THE CADDO I-V SEQUENCE

Caddo Division	Approx. Ages	Davis' Units	Wyckoff's Units	Webb's Units
Caddo I	1000-1200 AD	Alto Focus pre-Sanders	Alto Focus, Harlan Complex	Alto, Gahagan
Caddo II	1200-1400 AD	Sanders Focus Haley Focus	Haley Focus, Sanders Focus, Hochatown Complex, Spiro Focus	Haley
Caddo III	1400-1500 AD	Whelan Complex Bossier Focus	Whelan Complex, Bossier Focus, McCurtain Focus, Texarkana Focus, Mid-Ouachita Focus, Fort Coffee Focus	Bossier
Caddo IV	1500-1700 AD	Titus Focus Texarkana Focus Belcher Focus McCurtain Focus	Titus Focus, Angelina Focus, Belcher Focus, McCurtain Focus, Frankston Focus, Mid-Ouachita Focus, Neosho Focus, Fort Coffee Focus	Titus, Belcher, Texarkana
Caddo V	post-1700 AD	Norteno Focus	Allen Focus, Glendora Focus, Kinsloe Focus, Mid-Ouachita Focus, Lawton Focus, Little River Focus	Glendora

Webb's data are from E. Davis (1961:136-137); Davis' data from Davis (1970:39-58) and Wyckoff's data from Wyckoff (1971). Note that Webb's and Davis' schemes are valid only for the Red River and its tributaries, while Wyckoff's scheme is relevant for the entire Caddoan area.

tence change; corresponding social and political changes hypothesized from the available data are also included. Story's system tied in east Texas with models developed for other sections of the eastern United States, and affords a convenient overview within which to assess any local chronologies.

<u>Cypress Basin Chronology</u>

Thurmond's (1981) chronology for the Cypress Basin is the first for a major east Texas drainage. His methodology and criteria for temporal separation are well-conceived and clearly presented. His work provides an excellent model, applicable for chronologic refinement in other basins.

Before presenting Thurmond's model, several points must be clarified. The terminology used in the chronology varies between the Early Caddoan and Late Caddoan divisions, reflecting what are perceived to be differences in the level of socio-political integration (Thurmond 1981: 421). Prior to the Late Caddoan period, the chronological classification is divided into periods, "which are simply temporal divisions with no spacial implications of internal relevance to the Cypress Basin" (ibid:421). The Late Caddoan period is further subdivided into phases "to denote chronological change within the late Caddoan local cultures labelled foci by Krieger" (ibid:421). The spatial element to Krieger's "focus" is the term "cluster," adapted from Story and Creel (1981:20-34) to refer to the archaeological manifestation of a local culture (Thurmond 1981:422). The present author's usage of these terms is limited to the Cypress Basin cultures; original terms defining other cultural units are retained.

The Late Caddoan period is divided into east and west segments, the dividing line being a north-south axis just west of Caddo Lake. This geographic separation corresponds with differences in Late Caddoan cultures recognized by Krieger (1946) and Webb (1948). The chronology applies to the entire basin until the Late Caddoan period, at which point separate phases are defined for the eastern and western areas. Thurmond re-evaluated the data for the Western Cypress Basin chronology, but relied on Webb (1948, 1959) for the Eastern Cypress Basin section.

The following summary of Thurmond's chronology concentrates on the Caddoan periods, particularly the Late Caddoan. In this way, the temporal data and issues relevant to this thesis are emphasized.

Paleo-Indian: 10,000 - 6000 B.C.

Paleo-Indian components have been identified in the Cypress Basin, all on the basis of projectile points from surface collections or from excavated mixed contexts. Thurmond (1981:91) further divides this period into Early Paleo-Indian (10,000 - 8000 B.C.) on the basis of Clovis and Folsom fluted projectile points, and Late Paleo-Indian (8000 - 6000 B.C.) when Meserve/Dalton, Plainview, San Patrice and Scottsbluff projectile points, side-notched dart points and Albany bevelled bifaces are present.

Archaic: 6000 - 200 B.C.

The Archaic period is subdivided into: 1) Early Archaic (6000 - 4000 B.C.) represented by dart point types Bulverde, Calf Creek, Carrolton, Dawson, Morrill and Wells, and by stemless triangular dart points; 2) Middle Archaic (4000 - 2000 B.C.) represented by dart point types Edgewood, Ellis, Evans, Lone Oak, Palmillas, Trinity, Wesley and Yarbrough, and also by all untyped straight or expanding stem dart points; and 3) Late Archaic (2000 - 200 B.C.) represented by dart point types Ensor, Gary, and Kent, and also by all untyped contracting stem dart points.

Early Ceramic: 200 B.C. - A.D. 800

Thurmond (1981:91) characterizes Early Ceramic components by the presence of sandy paste pottery, Williams Plain pottery or any Marksville/Troyville period pottery types. Early Ceramic components may also include Late Archaic dart point types. The first mounds (i.e., the Bellevue site in northwest Louisiana) occur in the Cypress Basin during this period (ibid:407).

Early Caddoan: A.D. 800 - 1400

Thurmond (1981:91-92) subdivides the Early Caddoan period as follows: 1) Period 1 (A.D. 800 - 1200) represented by pottery types Davis Incised, Holly Fine Engraved, Kiam Incised, Spiro Engraved and Weches Fingernail-Impressed, and also by Coles Creek Incised pottery or any Coles Creek trade wares; and 2) Period 2 (A.D. 1200 - 1400) represented by pottery types Canton Incised, Haley Engraved, Maxey Noded Redware, Sanders Engraved and Sanders Plain. This Early Caddoan period marks the emergence of the earliest sedentary farmers of East Texas - the Caddo. Corn is assumed to be the major cultigen, although hunting and gathering may have supplied a major portion of the diet.

Transitional Early to Late Caddoan (Western Cypress Basin): A.D. 1400 - 1500

Thurmond set up this period to account for sites having ceramics indicative of both Early Caddoan Period 2 and Whelan Phase characteristics (1981:92). The ceramics from sites of this intermediate chronological period suggest cultural continuity between the Early and Late Caddoan cultures.

Late Caddoan (Western Cypress Basin): A.D. 1500 - 1700

This period is subdivided (ibid:92) into the following phases: 1) Whelan Phase (A.D. 1500 - 1600) represented by pottery types Pease Brushed-Incised and Ripley Engraved, the latter having specific motifs with border elements filled with crude curvilinear hatchuring, and also by arrow point types Scallorn and Perdiz; and 2) Titus Phase (A.D. 1600 - 1700) represented by pottery types Bailey Engraved, Harleton Applique, Karnack Brushed-Incised, LaRue Neck Banded, Ripley Engraved (having motifs defined by broad excising and engraving), Taylor Engraved and Wilder Engraved, and also by arrow point types Maud, Reed and Talco. The lifestyle represented by the Late Caddoan cultural components suggests a continuity with that of the Early Caddoan peoples. The Late Caddoan period is characterized by sedentary farmers who are believed to have lived in more dispersed villages than in the Early Caddoan (Woodall 1969). Mound building was less elaborate, although it is assumed that mound centers still served as redistribution loci (Story 1981:150). The dispersed settlement pattern may have resulted in the disruption of the extensive trade networks set up by the Early Caddoan period elite (ibid: 151). Most of the western Cypress Basin Whelan Phase sites have mounds, while those of the Titus Phase are predominantly cemeteries. Both phases are represented by small settlements (Thurmond 1981:407).

Late Caddoan (Eastern Cypress Basin): A.D. 1400 - 1700

The Late Caddoan period for the eastern Cypress Basin is subdivided as follows (Thurmond 1981:92): 1) Bossier Phase (A.D. 1400 - 1550) represented by pottery types Belcher Ridged, Bossier Brushed, Maddox Engraved, Pease Brushed-Incised and Sinner Linear Punctated, and also by arrow point types Alba, Bassett, Scallorn and Perdiz; and 2) Belcher Phase (A.D. 1550 - 1700) represented by pottery types Avery Engraved, Belcher Engraved, Belcher Ridged, Cowhide Stamped, Foster Trailed-Incised, Glassell Engraved, Hodges Engraved, Karnack Brushed-Incised, Keno Trailed, and Taylor Engraved, and also by arrow point types Bassett and Maud. The lifeways of these Late Caddoan peoples in the eastern basin are similar to those living in the western basin (Webb 1959, 1983). An exception is the survival of mound building to a later date (i.e., Belcher Phase) in the eastern Cypress Basin.

Validity of the Whelan Phase

One uncertain issue related to the culture history of the basin concerns the discreteness of the Whelan Phase. In the following discussion, the historical taxonomic terms (rather than those used by Thurmond) are used.

Originally termed the Whelan Complex (Davis and Gipson 1960:69) in order to avoid the implications of formal terms such as "phase" or "focus," this cultural manifestation referred to a group of sites located within the middle reaches of the Cypress Basin. These sites - including Harroun, Whelan and Dalton - shared ceramic traits and the presence of mounds erected over the remains of burned structures. The ceramics from these sites included diagnostics from the Titus and Bossier Foci. Davis and Gipson (ibid:74) recognized these traits from temporally and spatially different foci, and concluded "it seems most useful to include the Whelan Complex...in the Titus Focus, by expanding the definition of the latter." The temporal relationship was defined by excavators of several Whelan Complex sites (Davis 1958; Davis and Gipson 1960; Jelks and Tunnell 1959); all agreed that sites of the Whelan Complex predated those of the Titus Focus.

Recent researchers in the Cypress Basin have generally recognized the similarities evident in the ceramics from both Whelan and Titus Focus sites (McCormick 1974; Turner 1978). The most direct statement (Bruseth and Pertulla 1981:91) acknowledged that the similarities were so great that "the Whelan Complex seems to be nothing more than the Titus Focus with a single aberrant pottery type."

In contrast, the temporal relationship between these two foci was not well defined. Turner's conclusion presented the crux of the issue: "The earliest presently known sites which may be included in the Titus Focus, or as directly ancestral to it, are those of the Whelan Complex of the Caddo III period" (1978:104). The question still remained: is the Whelan Complex contemporaneous with or ancestral to the Titus Focus?

Thurmond's synthesis reiterates Davis and Gipson's original position in his definition of the Cypress Cluster, a well-defined Late

Caddoan local culture along the Cypress that may correspond in socio-political terms to Swanton's (1942) "confederacy." Thurmond regards the Whelan Complex (which he calls the Whelan Phase of the Cypress Cluster) as "the earliest clear crystallization of the Late Caddoan local culture" (1981:439). Distinctive ceramic designs and vessel forms, different frequencies of ceramic body treatments, arrow point types, and mounds distinguish the Whelan Phase from the Titus Phase. Moreover, the shared ceramic and arrow point types of the two phases suggest a cultural continuum; cross-dating of ceramics with stratigraphically discrete components at the Belcher site provides the evidence for temporal separation. Thus, Thurmond seems to have satisfactorily resolved the question of the validity of the Whelan Complex (or Whelan Phase) by recognizing its separate status as a phase which directly precedes, and develops into, the Titus Phase.

Summary

A succession of regional chronologies for the Caddoan area has resulted in progressively more refined temporal and spatial units. Thurmond's (1981) chronology for the Cypress Basin is valuable for recognizing the cultural continuity between the Early and Late Caddoan periods in a transitional period, and for incorporating terminology that reflects socio-political differences between both periods. The controversy over the validity of the Whelan Complex is resolved by his definition of the Cypress Cluster.

Chapter 4

HISTORY OF SITE INVESTIGATIONS

All of the work done at the Whelan site was in conjunction with the Ferrell's Bridge Reservoir Project. The phases of investigation are described in chronological order. The main sources for the following summary are the site journals, unit notes, maps and profiles from the University of Texas (at Austin) excavation, Davis' 1958 preliminary report, Miller and Moorman's original survey form and the River Basin Surveys report (1951). All of the primary data are housed at the Texas Archeological Research Laboratory in the county and reservoir files.

River Basin Surveys: 1951

The Whelan site was initially recorded on February 9, 1951 by the River Basin Surveys team of E.H. Moorman and E.O. Miller. A local informant, Mr. J.H. Chatham, guided the surveyors to the site, which was obscured by dense woods. Three mounds lying in an east-west line were recorded. Each mound received a separate site number (29A6-2, 29A6-3 and 29A6-4) under the state quadrangle system, the method for site designation in use at the time of the survey. The dimensions and shapes of each mound were recorded, although the survey form does not indicate whether the measurements were exact or approximate. Only the center mound, which was later designated as Mound B, was tested. Undecorated sherds and abundant charcoal indicated its artificial nature. Mr. Chatham mentioned an island in the bayou, which Miller and Moorman considered a possible additional mound; unfortunately, high water prevented their verifying this assumption.

In the report (Miller et al. 1951) the Whelan site received a single number, 29A6-2; this number was one of the three originally assigned to the mounds found at the site. This single designation identified the site until 1957 when the University of Texas (at Austin) adopted the Smithsonian trinomial system. At that point Whelan was renumbered as 41MR2, its present designation.

Although the dense vegetation prevented the discovery of surface artifacts, their single test pit convinced Miller and Moorman of the man-made nature of all three mounds. Moreover, they inferred the "presence of the mounds indicates with virtual certainty the existence of a large village site of relatively great importance" (1951:7). Therefore, they recommended extensive testing as well as excavation of at least one mound and the most promising parts of the village.

The University of Texas (at Austin) Excavation: 1957

Within five years of the survey, construction of the Ferrell's Bridge dam began. As a result, the earliest excavation was focused on sites within the Conservation Pool, slated for filling in late summer 1957. Located 6.4 kilometers northwest and upstream of the damsite, Whelan was the first site excavated because it was the only known site within the reservoir Conservation Pool and because of its proximity to the damsite. Prior to excavation, the site was visited by Edward B. Jelks and E. Mott Davis in October 1956. Vegetation was still dense, and necessitated Mr. Chatham's assistance in relocating the site. Soon thereafter, clearing crews opened up large wooded areas within the Conservation Pool, but did not clear the Whelan site, which fortunately was spared the destructive effects of mechanical clearing.

Excavation of the Whelan site took place in spring 1957. This phase of investigation was carried out by the Division of Research in Anthropology of the University of Texas in Austin through an agreement with the National Park Service as part of the Inter-Agency Archeological Salvage Program. The work at Whelan was supervised by Dr. E. Mott Davis, with W.A. Davis as assistant. Local laborers comprised the crews, but the assistance of volunteers such as Paul Rosenberg, Miles Richardson and Leroy Johnson, Jr. was particularly helpful.

Surface Appearance

The surficial evidence for a site consisted of four mounds, three of which were recorded by Miller and Moorman and a fourth found by Davis during his initial site reconnaissance (Fig. 5). The mounds were designated by letters; Mounds A through C correspond to the three noted by Miller and Moorman: 29A6-3 = Mound A, 29A6-4 = Mound B and 29A6-2 = Mound C. (For a different interpretation of the correspondence between the mound designations used by Miller and Moorman and Davis, see Davis 1958:13). Mound D was the new mound discovered by Davis; the mound mentioned by Mr. Chatham as being in the bayou was not located.

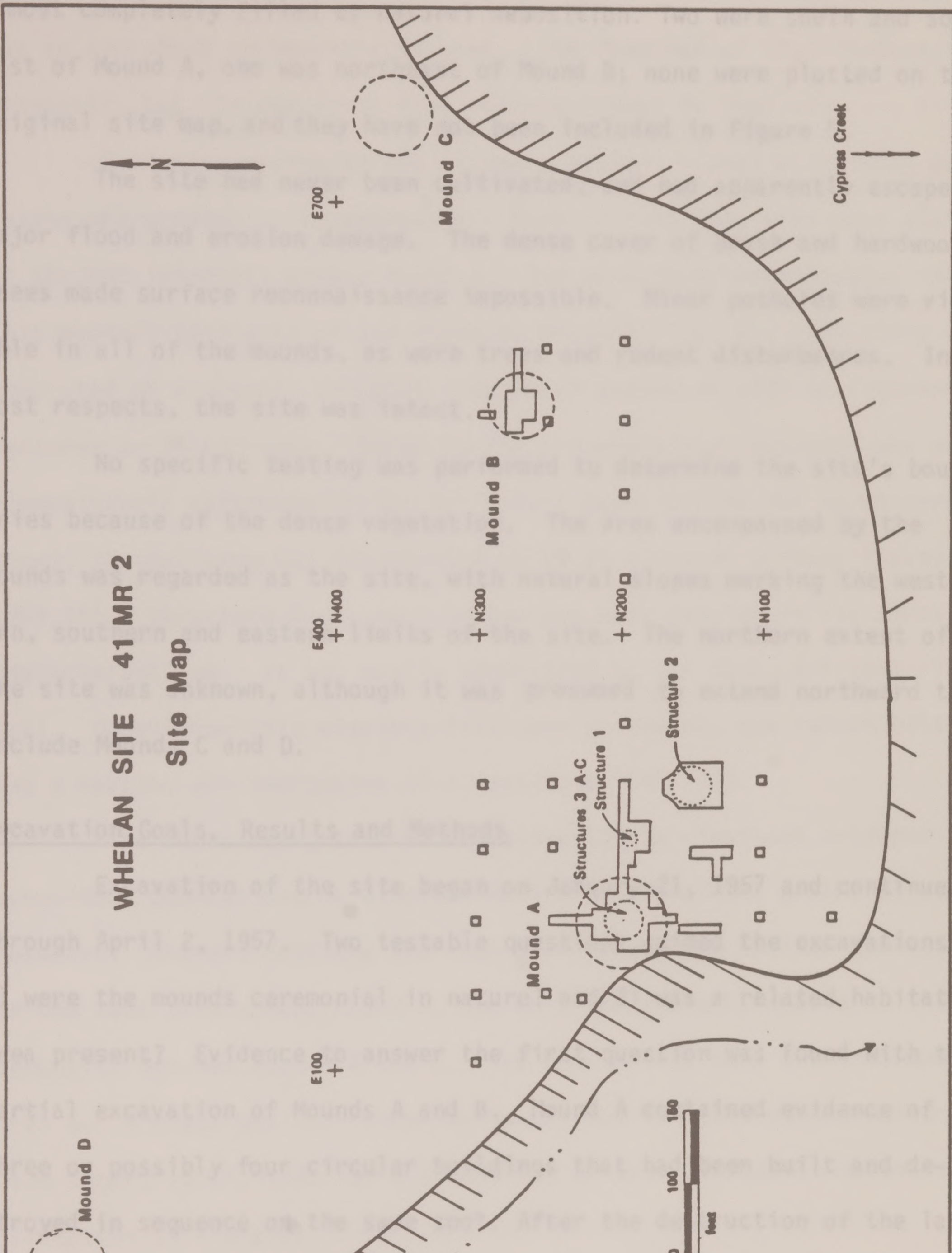
Mound A was the largest mound, while Mound B was the smallest. The dimensions of Mounds C and D are not provided in Davis' report, although they are said to be midway in size between Mounds A and B (1958: 14). In addition to the mounds, Davis mentions three faint borrow pits,

FIGURE 5

PLAN OF EXCAVATIONS

Adapted from Davis (1958:Fig. 2).

This version corrects the location of the excavation units southeast of Mound A, shown incorrectly on Davis' map.


WHELAN SITE 41 MR 2
Site Map
N
Mound C
Mound B
Mound A
Mound D
Structures 3 A-C
Structure 1
Structure 2
Cypress Creek
E700
E400
E100
N400
N300
N200
N100
0
50
100
150
feet

almost completely filled by natural deposition. Two were south and southeast of Mound A, one was northeast of Mound B; none were plotted on the original site map, and they have not been included in Figure 5.

The site had never been cultivated, and had apparently escaped major flood and erosion damage. The dense cover of brush and hardwood trees made surface reconnaissance impossible. Minor potholes were visible in all of the mounds, as were trees and rodent disturbances. In most respects, the site was intact.

No specific testing was performed to determine the site's boundaries because of the dense vegetation. The area encompassed by the mounds was regarded as the site, with natural slopes marking the western, southern and eastern limits of the site. The northern extent of the site was unknown, although it was presumed to extend northward to include Mounds C and D.

Excavation Goals, Results and Methods

Excavation of the site began on January 21, 1957 and continued through April 2, 1957. Two testable questions guided the excavations: 1) were the mounds ceremonial in nature? and 2) was a related habitation area present? Evidence to answer the first question was found with the partial excavation of Mounds A and B. Mound A contained evidence of three or possibly four circular buildings that had been built and destroyed in sequence on the same spot. After the destruction of the last structure (in this case there was evidence of burning), a capping of uniform fill was placed on top, creating the mound in its final form.

Excavation of Mound B concentrated on the investigation of a large burned hearth in the center of the mound. Surrounding the hearth was an amorphous carbon-stained area. The function of this feature is enigmatic, but its use for a fire-related ritual is implied.

Evidence bearing on the second question - that a resident population was present - is ambiguous. More than 20 test pits were placed at 50-foot intervals around Mound A. Two structures were located in this manner, both east of and close to Mound A (Fig. 5). Structure 1 consisted of a roughly circular pattern of postholes with no interior features or an entryway. Based on the archaeological evidence and an ethnohistoric reference (refer to Feature Descriptions for an elaboration), the building was interpreted to be an elevated granary (Davis 1958:35). Structure 2 was much larger and more regular in its circular posthole outline. It was easily identified by its dark, artifact-rich soil. Underlying this distinct fill were postholes, two refuse pits and a hearth, all indicative of a residence (ibid:38).

The surrounding test pits yielded little clear-cut evidence for a resident population. No discrete midden or additional postholes were detected. Sherds, debitage and daub were present in smaller quantities in the test pits around Mound A, and were particularly scarce in the test pits between Mounds A and B. The possibility that the intermound area was a plaza was not raised by Davis, but is worth consideration (see Rogers et al. 1982 for a discussion of criteria useful to the identification of a plaza).

Throughout the field season, the following excavation procedures were used. The horizontal control for the site was a stake centered on Mound A and designated N200/E200; it remained in a balk during the ensuing excavations. The top of the stake served as the site vertical control, being given an arbitrary elevation of 100 feet. The basic excavation unit was a 10 x 10 foot square, usually dug by ½-foot levels in four 5 x 5 foot squares. Artifact proveniences were recorded with this quadrant system, while the notes, profiles, and plan maps were kept for the larger 10 x 10 foot units. Rectangular or triangular shaped units of various dimensions were infrequently used. Excavation was by hand, using both shovels and trowels. Half-foot arbitrary vertical levels were used because of difficulties in determining cultural or natural strata. Screening was usually done through ½-inch mesh, although 1/3-inch mesh was occasionally used. Approximately 90% of the excavated matrix was screened; half of Mound B and the northeast quadrant of Mound A were not screened.

Features were recorded at the base of each excavation level; vertical cross-sectioning was the major technique used to investigate features. In most cases, feature fill was not screened or collected separately. Measurements for plan maps were taken with tapes and plumb bobs at right angles from grid lines or walls; crucial measurements were triangulated from grid points. A transit was used to check elevations determined by hand levels.

Methods of excavating the mounds varied. Mound A, sectioned in quadrants, was dug by several methods. The northwest quadrant was excavated in arbitrary levels, a technique that resulted in the loss of valuable posthole information because of the difficulty in recognizing postholes in horizontal section (Davis 1958:27). Subsequently, the southeast quadrant was dug in a combination peeling and slicing technique. The squares were first excavated by arbitrary levels until the contact with Zone II (see Feature Descriptions for Mound A) was reached. At that point the technique switched to vertical slicing to locate postholes by cross-sectioning. This combination provided the most detailed posthole information, including the definition of some postholes that had two separate fills. Excavation of the southwest quadrant was similar to that done for the southeast one, but differed in cutting a curved vertical face through Zones II and III (Fig. 6) to locate the upper sections of postholes. Unfortunately, an extensive disturbance obliterated much of the evidence for the upper series of postholes, but did not disturb the lower groups. The final quadrant, the northeastern one, was not excavated during this phase of work.

An entirely different method was used to excavate Mound B: a 5-foot trench was initially dug in 5 x 10 foot squares through the middle of the mound. In the center, a 20-foot square excavation unit was opened to explore a large burned area within. Another 10 x 10 foot square comprised the final excavation unit in Mound B.

Later Site Investigations: 1957-1959

After the spring excavations were completed, heavy rains began and the entire valley was flooded. The Whelan site was inundated, but re-emerged later in the summer. In August 1957, E.M. Davis and Miles Richardson returned to Whelan. At this time, the northeastern quadrant of Mound A was excavated to unravel the stratigraphic associations of postholes. This section was excavated "by slicing a vertical face, pivoting it around the center (i.e., N200/E200) of the mound" (Davis 1958:

28). Fourteen separate profiles resulted from this piecemeal approach. Soil and charcoal samples from Mound A contexts were also collected.

In September 1959, Davis returned to the Whelan site with Lathel Duffield. The purpose of their visit was to check the site's accessibility and condition for additional work later in the fall. They planned to test Mounds C and D, probe Mound B for burials and make a contour map of the site. However, the dense weeds and head-high grases precluded any additional extensive work.

A final brief visit to the site occurred in early October 1959. Davis was accompanied by Richard Ross and Curtis Tunnell. They quickly tested Mounds C and D with a posthole digger core in each, and probed Mound B in several places. Soon thereafter heavy rains began, and the site was permanently inundated by October 15, 1959.

Feature Descriptions

The major features at the site are the four man-made mounds, the two non-mound structures and the borrow pits. Interior features were investigated in Mounds A and B, and in Structure 2. Descriptions of these features are provided below. Since the original measurements of the features are given in the English system, dimensions cited herein will be both in English and the now more commonly used metric system.

Mound A

Mound A was the largest mound at the site and, as it turned out, the largest in the Whelan Phase. It was 1.5 meters (5 feet) high and 19.5 meters (65 feet) in diameter (Davis 1958:23). It was circular, and

and its top somewhat flattened.

The first test pit into the mound confirmed its artificial nature with the evidence of stratified fill that was most clearly defined in the central section of the mound. Figure 6 is a simplified rendition of a profile through the center of the mound; a 4:1 vertical exaggeration is used to emphasize the strata. Zones I and III were comprised mainly of B horizon soil; their similarities in color and texture were strong enough that differentiation between them was impossible except where Zone II or the upper portion of Zone I lay between. Zone II consisted mainly of stratified material which is clearly separable from the adjacent zones.

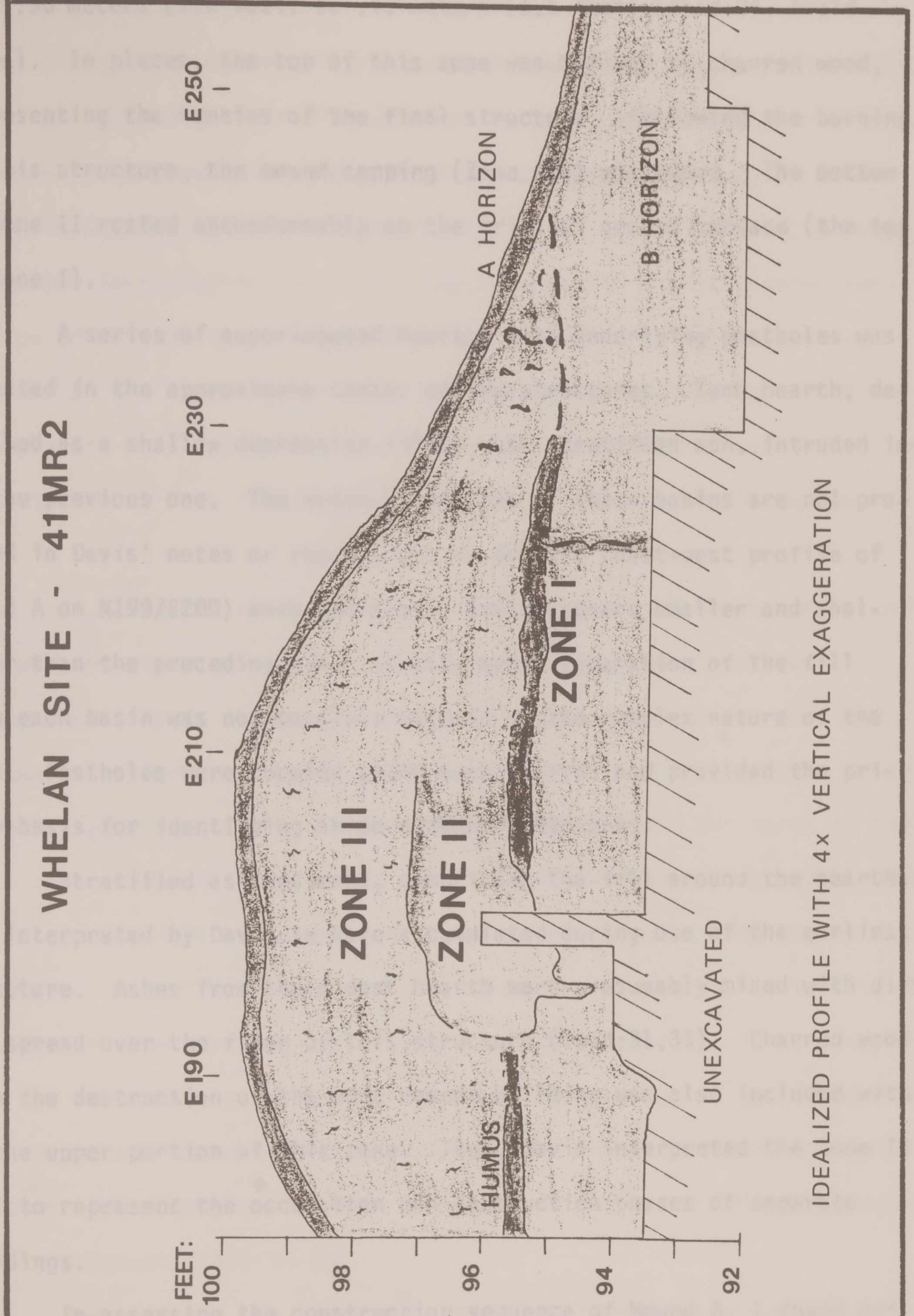
Zone I consisted of an upper layer of purple-brown sand .18 meters (.6 feet) thick, underlain by at least 1.2 meters (4 feet) of medium brown sand (ibid:25). The upper section is interpreted to be a buried A horizon which was the aboriginal ground surface. The lower portion of this zone is interpreted to represent B horizon soil. This A and B horizon sequence is identical to a natural soil profile described for the site (ibid:21-22). Zone I is defined best in the central part of the mound; toward the outer edges of the mound, the A horizon is less distinct, and differentiation between Zone III and the lower portion of Zone I is difficult. The hearth and postholes of the oldest structure intrude into this zone.

Zone II was a deposit composed of stratified soil layers within a circular area 5.4 meters (18 feet) in diameter at the center of the mound; this diameter corresponded with the area of the most recent structure (ibid:24, field notes). The thickness of the deposit ranged

FIGURE 6

A SIMPLIFIED EAST-WEST PROFILE IN MOUND A

Profile is drawn along the N200 line, which is the approximate center of the mound.


WHELAN SITE - 41MR2
E190
E210
E230
E250
A HORIZON
B HORIZON
ZONE III
ZONE II
ZONE I
HUMUS
UNEXCAVATED
FEET: 100
98
96
94
92
IDEALIZED PROFILE WITH 4x VERTICAL EXAGGERATION

from .36 meters (1.2 feet) to .45 meters (1.5 feet) (ibid:24, field notes). In places, the top of this zone was defined by charred wood, representing the remains of the final structure. Following the burning of this structure, the mound capping (Zone III) was added. The bottom of Zone II rested unconformably on the original ground surface (the top of Zone I).

A series of superimposed hearths with underlying postholes was detected in the approximate center of the structures. Each hearth, described as a shallow depression filled with stratified ash, intruded into the previous one. The areal dimensions of these basins are not provided in Davis' notes or report, but in profile (east-west profile of Mound A on N199/E200) each successive basin appears smaller and shallower than the preceding one. Stratigraphic separation of the fill from each basin was not possible because of the complex nature of the fill. Postholes were located under each hearth, and provided the primary basis for identifying three sequent structures.

Stratified ash and sand, comprising the fill around the hearths, was interpreted by Davis to have accumulated during use of the earliest structure. Ashes from the oldest hearth were presumably mixed with dirt and spread over the floor of this structure (ibid:31,33). Charred wood from the destruction of the most recent building was also included within the upper portion of this zone. Thus, Davis interpreted the Zone II fill to represent the occupation and destruction phases of separate buildings.

In assessing the construction sequence of Mound A, I found evidence that calls for a reinterpretation of the context and source of the stratified fill within Zone II. The relevant notes, profiles and color slides indicate that stratified silts and clay bands also comprise this zone. In fact, most of the excavation and profile descriptions do not even mention the ash. An analysis of the ceramics from Zone II (discussed in Chapter 7) demonstrates that refired (highly oxidized) sherds are rare. This finding contradicts my expectation that a greater percentage of refired sherds would be present in Zone II which resulted from use of the fireplace or building destruction by burning. Both the incompletely oxidized sherds and the relative scarcity of ash suggest to me that Zone II is a secondary deposit rather than an in situ accumulation.

In addition, my reexamination of the primary data indicates that an important stratigraphic relationship involving the stratified fill was misread. It is clear from the profiles and color slides that the earliest fireplace was dug out of the stratified fill; therefore, this fireplace <u>postdated</u> the deposition of the fill and did not serve as the major source for this fill. The most recent structures (3 A and B) also postdated this fill since the postholes associated with them cut through the fill. Thus, I interpret the fill to represent sequential additions of material from unknown, but probably multiple, sources. It is possible that the ash mixed in may have originated from the use of one or more of the fireplaces. A behavioral explanation for these additions is unknown, although a more complex sequence of events is indicated than Davis originally proposed (1958:32-33).

<u>Zone III</u> was the mound cap, comprised of medium brown sand. Since abandonment of the site, a thin humic horizon had developed at the

surface. Including this soil horizon, the zone was .75 meters (2.5 feet) to .9 meters (3 feet) thick in the center of Mound A, but thinned towards the edges (ibid:24). The composition of this fill was similar to the in situ B horizon soil, and almost certainly originated nearby. The addition of this fill was the last construction activity, creating the mound in its final form.

Structures 3 A-C

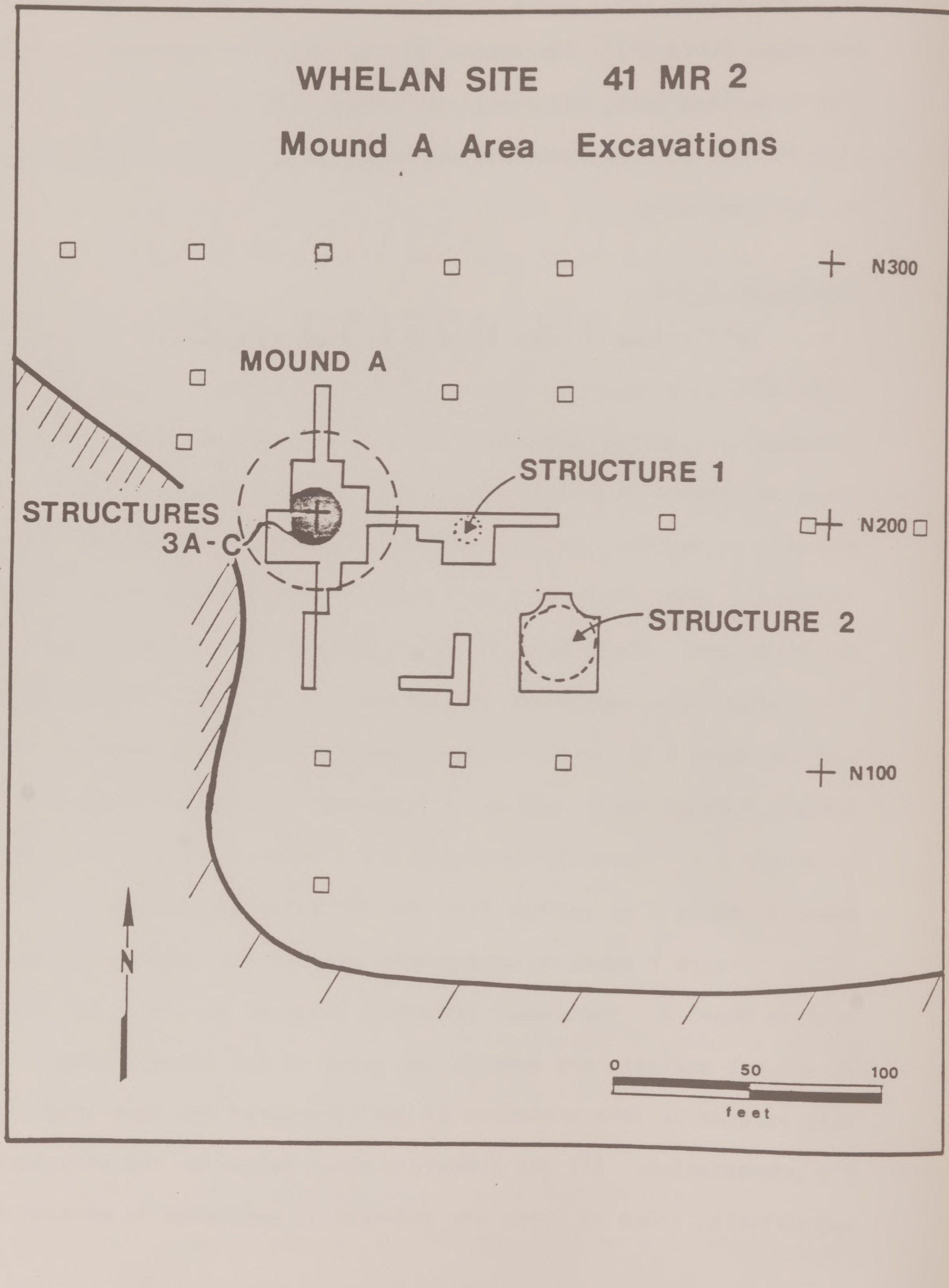
Within Zone II were additional features, most of which were postholes that were found to define a series of sequent structures. These buildings are called "structures" to avoid any functional implications. These structures were defined by posthole arrangements as well as the presence of hearths, many of the final interpretations being made in the laboratory after field work had ceased. No floor was associated with any structure. Davis defined four structures, designated Houses A-D. The present study describes only three; the possible fourth structure (called House C by Davis) is too tenuously defined to include. Correlations between Davis' and my designations for the buildings are: Structure 3 C = House D, Structure 3 B = House B, and Structure 3 A = House A; House C is omitted from the following discussion.

Figure 7 shows an approximate plan of the largest defined structure in Mound A. Individual structure plans as part of a detailed structural analysis are outside the scope of the present study. The data related to interpretation of the structures has been simplified for presentation. All the diameters given below for the structures are approximate, since at least one quadrant of postholes is missing for

FIGURE 7

MOUND A AREA PLAN OF EXCAVATION

Adapted from original site plan shown in Davis' report (1958:Fig. 2). This version corrects the location of the excavation units southeast of Mound A, shown incorrectly on Davis' map.


WHELAN SITE 41 MR 2
Mound A Area Excavations
N300
MOUND A
STRUCTURE 1
STRUCTURES
3A-C
N200
STRUCTURE 2
N100
N
0
50
100
feet

each structure. No dimensions are provided for the fireplaces in the field notes except depth, which ranges between .09 meters (.3 feet) to .15 meters (.5 feet). The structures are described in stratigraphic order from earliest to most recent.

Structure 3 C corresponds to Davis' House D, the earliest structure associated with Mound A. It was evidently built on the original ground surface (Zone I), since the fireplace and postholes appear to originate at the top of Zone I. Structure 3 C has an approximate diameter of 6.3 meters (21 feet), with its postholes extending .84 meters (2.8 feet) down and spaced .36 meters (1.2 feet) to .48 meters (1.6 feet) apart (ibid:29). In the southeast quadrant alone, two separate arcs were visible.

Davis interpreted some of the postholes associated with this structure to represent a second possible building (his House C). His evidence deserves consideration. In one quadrant two posthole arcs were detected at the same elevation, while in another they were clearly visible at two different elevations. There was one instance of a posthole intersecting another. The second set of postholes had a greater average spacing interval of .48 to .6 meters (1.6 to 2 feet); the diameter spanned by these postholes was 5.9 meters (19.6 feet). Differences in fill between the sets of postholes are not mentioned in this report. With no separately defined fireplace or center post associated with these few postholes, Davis recognized the tenuous nature of the two-house interpretation, and offered alternative explanations: a single house having a double row of postholes, or one house with evident repair.

Structure 3 B corresponds to Davis' House B, and is represented by both postholes and a fireplace. Many of the postholes defining this structure were the same as those for the subsequent structure (3 A); these postholes have discrete upper and lower fills. In the southeast and southwest quadrants, the postholes of the two structures are stratigraphically separate. The diameter of Structure 3 B has been approximated at 5.7 meters (19 feet), with its postholes extending .84 meters (2.8 feet) deep, and spaced between .42 to .54 meters (1.4 to 1.8 feet) apart (ibid:28).

Structure 3 A, corresponding to Davis' House A, had an approximate diameter of 5.1 meters (17 feet) and postholes only .42 meters (1.4 feet) deep (ibid:28). Davis believed that the relative shallowness of the postholes indicated a different type of structure. Many of Structure 3 A postholes were coincident with those of 3 B. As previously mentioned, vertical separation of the postholes was visible in two quadrants. Floors were not defined for either structure, but there were separate fireplaces with underlying central postholes. This building was the only one to have evidence of burning; charred wood was found at the interface between Zones II and III.

Mound B

This mound, the smallest of the four at Whelan, was .8 meters (2.75 feet) high and had an approximate diameter of 15 meters (50 feet) (ibid:39). A slight depression northeast of the mound was considered a possible borrow pit. The mound fill consisted mostly of medium brown sand, a thin humic horizon comprising the uppermost section. The fill was interpreted to be sterile, but it should be noted that only one-half of the mound fill was screened. Two distinct features were detected within the mound. Although no profiles were drawn for Mound B, I have been able to reconstruct a plan (Fig. 8) from sketches in the unit notes.

Feature 1019, a hearth, was in the approximate center of Mound B and was .75 meters (2.5 feet) in diameter. Its maximum thickness was .5 meters (1.5 feet), extending .3 meters (1 foot) above the surrounding ground surface (ibid:39). There was no evidence of successive episodes of burning, and the accumulation was considered to represent a single event (ibid:39). The fill consisted of carbonized material, ashes and reddish sand; no artifacts were noted in the fill.

Feature 1032, an adjacent area, was a poorly defined carbon-stained area surrounding Feature 1019, measuring about 3 meters (10 feet) north-south by 2.4 meters (8 feet) east-west (ibid:39). Within this larger area were sherds, bone, daub and sandstone fragments. The depth of the staining corresponded to that of the hearth, and may have extended .15 meters (.5 feet) lower (Mound B field notes). There were no postholes associated with this feature.

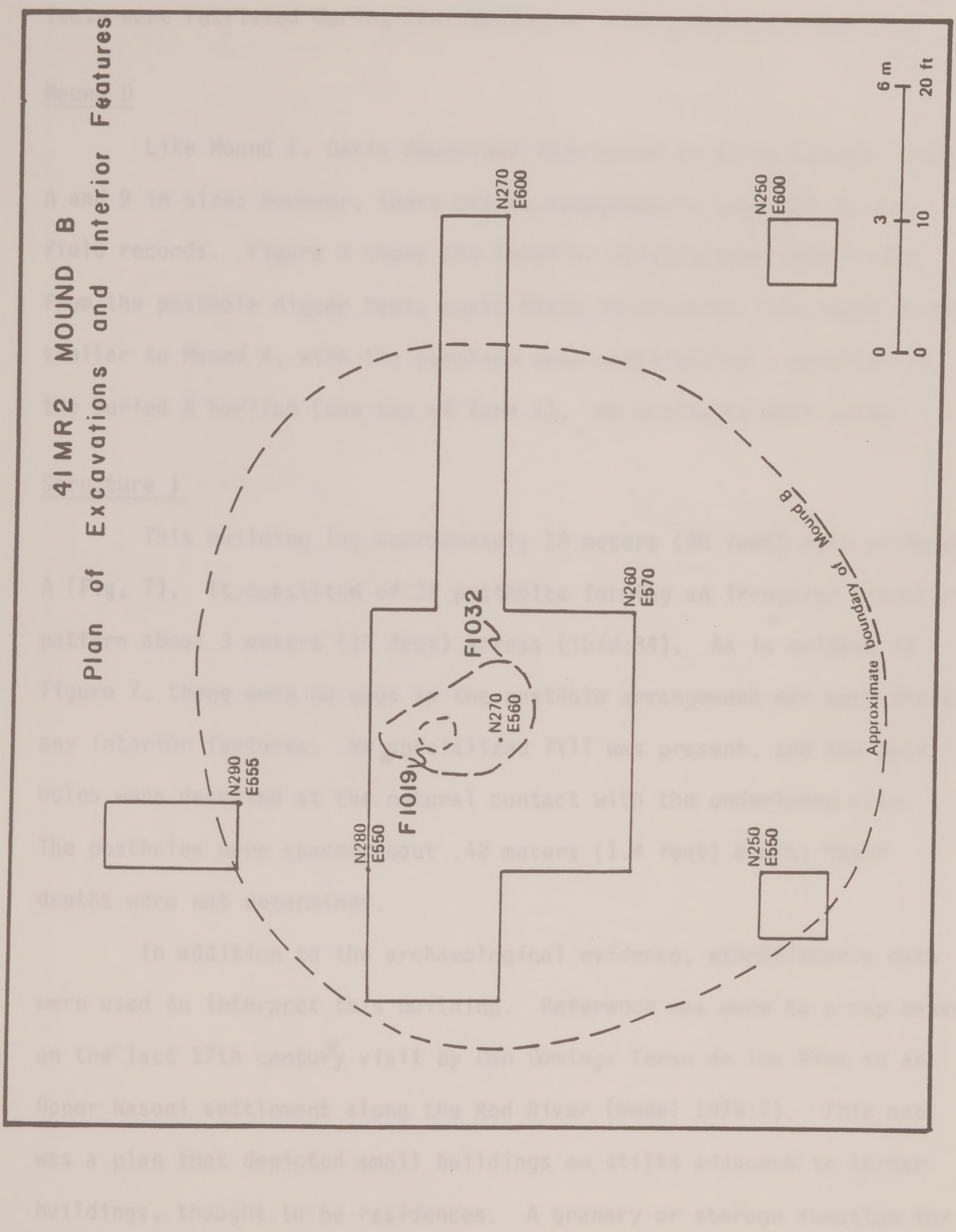
Mound C

Described by Davis as being midway in size between Mounds A and B, the approximate dimensions of Mound C can be compiled from the Miller and Moorman survey form: it was 1.2 meters to 1.5 meters (4 to 5 feet) high and 15 meters (50 feet) in diameter. A slight depression was noted in its center. Figure 9 shows the internal strata derived from

FIGURE 8

MOUND B PLAN OF EXCAVATION AND INTERIOR FEATURES

Drawn from descriptions and sketches in Davis (1958:39-40) and field notes.


41MR2 MOUND B
Plan of Excavations and Interior Features
N290
E555
N280
E550
F1019
F1032
N270
E560
N270
E600
N260
E570
N250
E550
N250
E600
Approximate boundary of Mound B
0
3
6 m
0
10
20 ft

a core dug with a posthole digger. Davis (in a journal entry dated October 3, 1959) considered this mound to be similar to Mound A. No artifacts were retrieved during the testing or from surface collections.

Mound D

Like Mound C, Davis described this mound as being between Mounds A and B in size; however, there are no measurements provided in the field records. Figure 9 shows the interior stratigraphy constructed from the posthole digger test; again Davis interpreted this mound to be similar to Mound A, with the purplish zone constituting a parallel to the buried A horizon (the top of Zone I). No artifacts were noted.

Structure 1

This building lay approxmately 18 meters (60 feet) east of Mound A (Fig. 7). It consisted of 22 postholes forming an irregular circular pattern about 3 meters (10 feet) across (ibid:34). As is evident in Figure 7, there were no gaps in the posthole arrangement nor were there any interior features. No specialized fill was present, and the postholes were detected at the natural contact with the underlying clay. The postholes were spaced about .42 meters (1.4 feet) apart; their depths were not determined.

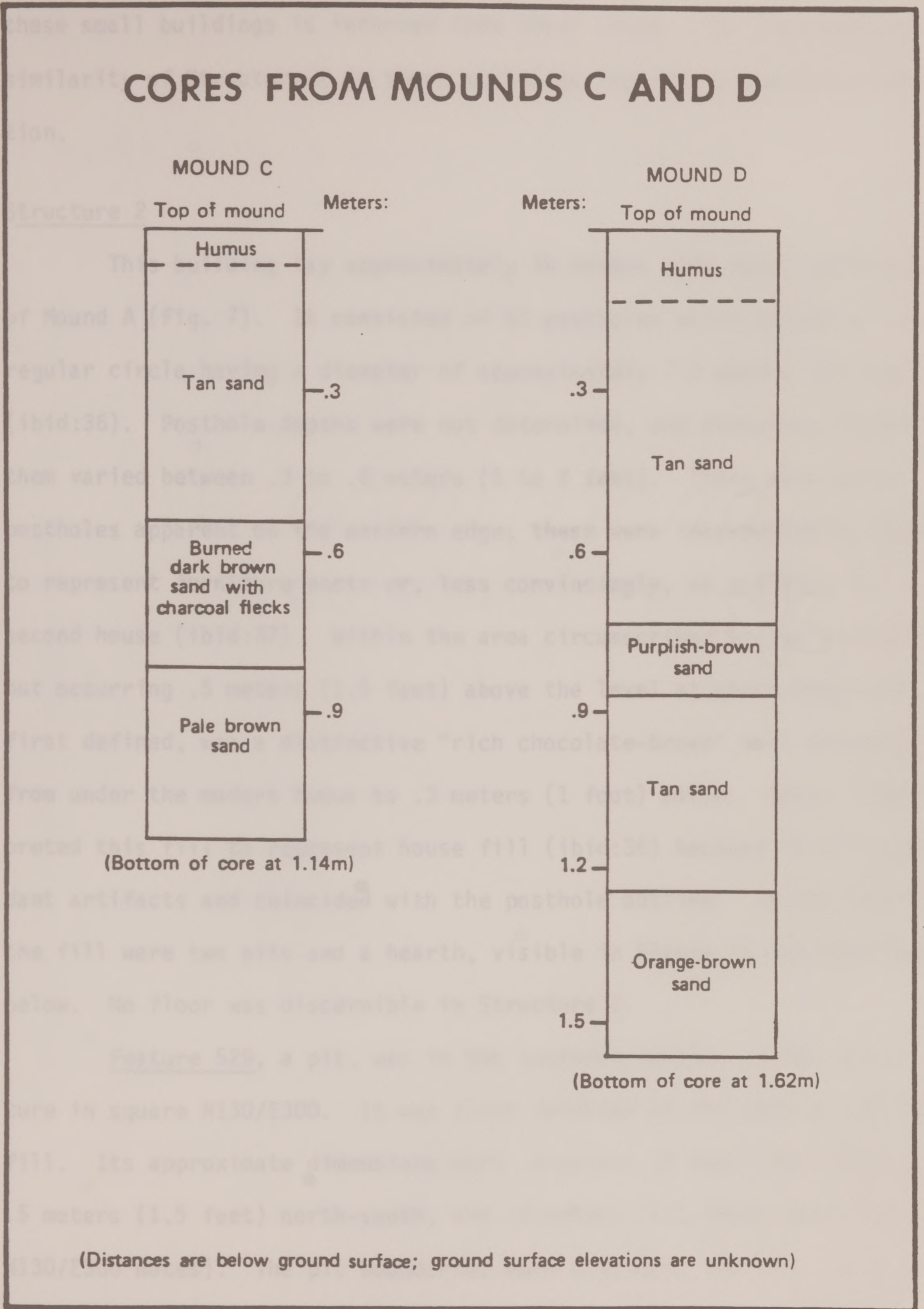
In addition to the archaeological evidence, ethnohistoric data were used to interpret this building. Reference was made to a map based on the last 17th century visit by Don Domingo Teran de los Rios to an Upper Nasoni settlement along the Red River (Wedel 1978:7). This map was a plan that depicted small buildings on stilts adjacent to larger buildings, thought to be residences. A granary or storage function for

FIGURE 9

CORES FROM MOUNDS C AND D

Drawn from sketches in field notes.

The cores were reconstructed from holes dug with a posthole digger.


CORES FROM MOUNDS C AND D
MOUND C
Top of mound
Meters:
Humus
Tan sand
.3
Burned dark brown sand with charcoal flecks
.6
Pale brown sand
.9
(Bottom of core at 1.14m)
MOUND D
Meters:
Top of mound
Humus
.3
Tan sand
.6
Purplish-brown sand
.9
Tan sand
1.2
Orange-brown sand
1.5
(Bottom of core at 1.62m)
(Distances are below ground surface; ground surface elevations are unknown)

these small buildings is inferred from their shape. The architectural similarity of Structure 1 to those buildings implies an analogous function.

Structure 2

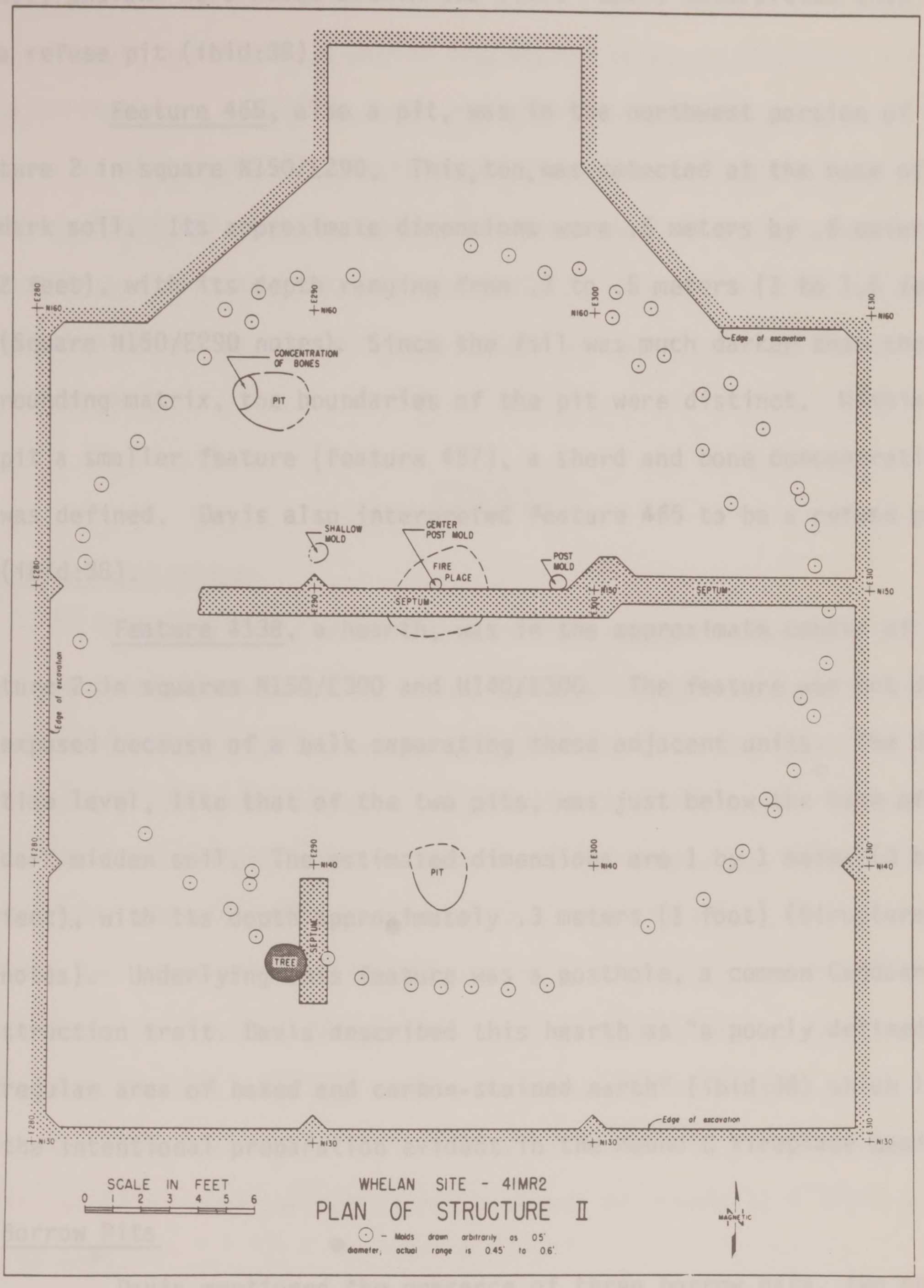
This building lay approximately 30 meters (100 feet) southeast of Mound A (Fig. 7). It consisted of 53 postholes which formed an irregular circle having a diameter of approximately 7.8 meters (26 feet) (ibid:36). Posthole depths were not determined, and distances between them varied between .3 to .6 meters (1 to 2 feet). There were extra postholes apparent on the eastern edge; these were interpreted by Davis to represent furniture posts or, less convincingly, as evidence for a second house (ibid:37). Within the area circumscribed by the postholes, but occurring .5 meters (1.5 feet) above the level at which they were first defined, was a distinctive "rich chocolate-brown" soil extending from under the modern humus to .3 meters (1 foot) below. Davis interpreted this fill to represent house fill (ibid:36) because it had abundant artifacts and coincided with the posthole outline. At the base of the fill were two pits and a hearth, visible in Figure 10 and described below. No floor was discernible in Structure 2.

Feature 529, a pit, was in the southern portion of the structure in square N130/E300. It was first detected at the base of the dark fill. Its approximate dimensions were .6 meters (2 feet) east-west by .5 meters (1.5 feet) north-south, and .5 meters (1.5 feet) deep (Square N130/E300 notes). The pit boundaries were distinct; the fill was a purplish-brown sand. Only one piece of ferruginous sandstone and one (ani-

FIGURE 10

STRUCTURE 2 PLAN OF EXCAVATION AND INTERIOR FEATURES

From Davis (1958:Fig. 5).



WHELAN SITE - 41MR2
PLAN OF STRUCTURE II
– Molds drawn arbitrarily as 0.5' diameter, actual range is 0.45' to 0.6'.

al?) phalanx were noted within the fill. Davis interpreted this to be a refuse pit (ibid:38).

Feature 465, also a pit, was in the northwest portion of Structure 2 in square N150/E290. This, too, was detected at the base of the dark soil. Its approximate dimensions were .6 meters by .6 meters (2 by 2 feet), with its depth ranging from .3 to .5 meters (1 to 1.5 feet) (Square N150/E290 notes). Since the fill was much darker than the surrounding matrix, the boundaries of the pit were distinct. Within the pit a smaller feature (Feature 457), a sherd and bone concentration, was defined. Davis also interpreted Feature 465 to be a refuse pit (ibid:38).

Feature 413B, a hearth, was in the approximate center of Structure 2 in squares N150/E300 and N140/E300. The feature was not fully exposed because of a balk separating these adjacent units. The detection level, like that of the two pits, was just below the base of the dark midden soil. The estimated dimensions are 1 by 1 meter (3 by 3 feet), with its depth approximately .3 meters (1 foot) (Structure 2 notes). Underlying this feature was a posthole, a common Caddoan construction trait. Davis described this hearth as "a poorly defined, irregular area of baked and carbon-stained earth" (ibid:38) which lacked the intentional preparation evident in the Mound C fireplace basins.

Borrow Pits

Davis mentioned the presence of three borrow pits, two near Mound A and one near Mound B. Without a contour map or extensive testing, it is difficult to comment on these features. Fortunately, the borrow pit situated south of Mound A was tested and can be verified in north-south profiles. A gentle depression began at N140/E200 and extended northward to N170/E200, with the greatest depth of .5 meters (1.5 feet) at N160/E200. The north-south dimension was approximately 10 meters (30 feet), but the east-west size cannot be ascertained from the profile (profile on E200, N130 to N170) or notes. The fill in this depression resembled a normal soil column at the site in which no laminae were evident.

Discussion

Site Investigations

Although it is not the aim of this chapter to provide a critique of the investigations of the site, certain limitations must be mentioned because of their bearing on the interpretations of the site. The major difficulty has been incomplete documentation of features. In general, feature descriptions were not consistent in terminology or attributes recorded, and are difficult to retrieve from the square and unit notes. There are relatively few scaled drawings, no profiles or scaled plans of the interior features for Mound B, and no plans plotting the interior features for the buildings within Mound A. On the original maps, data has been approximated (i.e., the size of Mound D on the site map) or simplified (i.e., the perfect circular shapes of Mounds A, B and C on the site map).

In spite of these problems, the excavations did recover a large and useful body of data. At the time of Davis' work, little was known about structural mounds in the Caddoan area. Put into an historical perspective, the results of the investigations increased the existing knowledge about the nature and complexity of features from a ceremonial site. Analysis of the site refined the questions that later researchers sought to answer, and resulted in abundant artifact and feature data useful for comparison with other Late Caddoan mound sites. A sizeable artifact collection, the largest from a Whelan Phase site, was recovered. In particular, the ceramic artifacts merit study for their typological and functional information. In sum, results from the investigations at Whelan were, and continue to be, valuable sources of data for the interpretation of ceremonial sites.

Interpretation of Site Features

In light of recent analyses, buildings such as those under Mound A would be termed special purpose structures "that provided a physical context for the integration of social organization beyond that of the household unit" (Rogers 1982:49). Archaeologically, these buildings can be defined as structures directly associated with mounds or having unusual architectural characteristics, such as extra large dimensions (ibid:49). An examination of the evidence pertaining to the three Mound A buildings documents their unusual characteristics.

Several circumstances serve to differentiate these buildings from Structure 2, a presumed residence. First, the repeated use of the same location for the buildings indicates an unusual behavior that may be related to the significance of this locale or of these buildings. The reuse of postholes (in Structures 3 A and B) also evinces different construction practices.

The second unusual aspect of these structures is their apparent deliberate destruction and possible dismantling of the older two (Structures 3 C and B), and burning of the most recent (Structure 3 A). Dismantling is suggested by the absence of construction material that can be related to Structures 3 B and C, while the burning is evidenced by charred structural remains that are attributed to Structure 3 A. Alternatively, it is possible that the two earlier buildings were also destroyed by burning, and the resultant debris cleared before the construction of Structure 3 A.

The final line of evidence comes from the capping of the structures, particularly the addition of Zone III which postdates the use of the structures and thus represents a final "sealing" event. Clearly, it is the buildings associated with Mound A, rather than the mound per se that is important. Functions suggested for special purpose buildings at other Caddoan centers include temples, meeting halls, charnel houses and as residences of chiefs (ibid:49). Although it is difficult to determine the function(s) of the buildings associated with Mound A, it is probable that they served as temples or as special residences. The relatively small size of Structures 3 A-C seems to negate their use as an assembly house, while the absence of secondary burials at Whelan weakens the case for a charnel house.

My analysis of the primary data related to Mound B refines Davis' original statement that "the cultural significance of Mound B remains a mystery" (1958:40) in two ways: 1) it obviously served as the locus for activities that differed from those of the structures in Mound A, and 2) its construction or use may be as part of a fire-related ritual. Ethnohistoric references (Swanton 1942:213-217) on the import of fire in Caddoan rituals serves to support this interpretation.

Mounds C and D have been identified by Davis as being similar to Mound A. I agree that Mound D has internal stratigraphy much like that of Mound A, and may have served as the locus of other special purpose buildings. However, I do not think the evidence is strong enough to make any conclusive statement about the function of Mound C.

The interpretation of Structure 2 is confusing because, with a vertical distance of .5 meters (1.5 feet) separating the overlying midden fill from the postholes, the correspondence of the fill to the posthole outline is ambiguous. In Davis' original report, he associated the midden fill with the use of the structure (1958:38). However, he has recently suggested (personal communication 1983) that the fill may be trash discarded in an abandoned structure and would thus postdate the use of the structure. My examination of the unit profiles in Structure 2 indicates that the midden fill overlies all interior features, and thereby postdates them. In accord with Davis' recent interpretation, I consider the fill to represent a midden accumulation, perhaps within the structural outline of an abandoned building (i.e., Structure 2). At the A.C. Saunders site, a Frankston Focus Late Caddoan mound site, a large midden overlay a structure and several external hearths (Kleinschmidt 1982:46). However, the midden clearly extended past the boundaries of the underlying structure and thus could not represent debris discarded in the structure after abandonment.

The main questions remaining concern the function of Structure 2 and the source of the midden which is now seen to be a secondary deposit. Davis originally suggested that this structure served as a residence for an elite individual. An alternate possibility is that this structure was used by a caretaker, who may or may not have been a member of an elite group. The activity areas that produced the specimens found in the overlying midden are difficult to ascertain primarily because the excavations at Whelan were not extensive. Debris from activities related to the use of the Mound A structures is a possible, but unverifiable, source for this deposit.

From both archaeological and ethnohistorical evidence, Structure 1 is interpreted to be an elevated granary or storage crib. The presence of a presumed storage facility at Whelan may indicate a possible warehousing of goods. Similar functions have been inferred for small buildings at the George C. Davis site (Spock 1977:170).

In sum, the special purpose buildings associated with Mound A, as well as the fire-related activities evident in Mound B, leave little doubt that the Whelan site is appropriately classified as a ceremonial center. Regardless of the functions of Mounds C and D, their presence further supports this interpretation. Although the existence of a resident community cannot be ascertained, a residence, possibly for an elite member of the society, is inferred by the archaeological evidence for Structure 2. The presence of a possible storage facility is suggested by the remains of Structure 1. Associated mainly with Mound A and Structure 2 is a large, well-documented ceramic collection, from which additional refinements of site interpretations can be made.

Summary

Archaeological investigation of the Whelan site concentrated on the partial excavation of two mounds and the complete excavation of two non-mound structures. The ceremonial interpretation of the site is justified by the presence of special purpose buildings within one mound and a hearth from presumed fire-related activities at the other. The non-mound structures are interpreted to be a possible residence, capped by a midden accumulation postdating the use of the building, and a possible elevated granary. Through a review of the primary data on features, I reinterpreted several stratigraphic relationships in Mound A and Structure 2. My analysis of the ceramics, particularly from these two contexts, examines the characteristics of an assemblage from a ceremonial site.

Chapter 5

METHODS

"Pottery has probably been the subject of more study and discourse by archaeologists than any comparable class of artifacts" (Hally 1983a:163). Stylistic attributes have been used to document cultural and temporal affiliation (Ford 1952; Phillips 1970), to examine sociopolitical complexity (Upham et al. 1981), to seriate mortuary collections (Brown 1971), to reconstruct social organization (Hill 1970), and to infer social changes related to stability (Davis 1981) or stress (Deetz 1965; Hodder 1979).

A complementary area of ceramic analysis involved functional studies, which are broadly defined as those concerned with the manufacture, use and disposal of artifacts (Taylor 1982:1). Although as early as 1944 Linton related vessel form to vessel function, it is only in recent years that archaeologists (e.g., Braun 1980; Steponaitis 1983; Hally 1983a) have focused on the technological, morphological and contextual aspects of vessels or sherds to answer questions about vessel use.

An important aspect of my study is an intrasite analysis concerned with the kinds of activities that can be inferred from ceramic use and disposal. Since such studies are not yet as common as those with a stylistic or typological emphasis, the pertinent literature is summarized below. First, the more general studies are briefly described; then those that have been written thus far in the Caddoan area. The final section provides the rationale specific to this study and the methods used.

Literature Review

Since Linton's pioneering work, subsequent studies of vessel shape (Braun 1980; Hally 1983a; Lischka 1978) have basically reiterated his form-determines-function maxim. Important to the fragmentary condition of the ceramics from the Whelan site, vessel shape can be inferred by single sherds (Erickson and de Atley 1976), by rim diameters (Fitting and Halsey 1966; Hally 1983a; Whallon 1969), and by combinations of rim and neck shapes (Braun 1980). Ethnographic data on vessel shapes consistently demonstrate that jar forms are used for cooking and storage, and bowls for food preparation and serving (Braun 1980; David and Hennig 1972; Stanislawski 1978). Vessel function has also been inferred by the presence of wear marks (Griffiths 1978; Hally 1983b), organic residue (Hally 1983b; Linton 1944), the absorption level of phosphorus in vessel walls (Duma 1972), and the extent of oxidation discoloration (Hally 1983b). The size of vessels has also been related to their function, and inferentially, to the size of the producing household (Turner and Lofgren 1966).

Differential life spans of vessels have been recognized from ethnographic studies (David 1972; David and Hennig 1972; DeBoer 1974; Foster 1960) which emphasize that functional ceramic classes have different usage and breakage patterns. Methods of artifact disposal have only recently been examined through ethnographic (Hayden and Cannon 1983) and ethnoarchaeological (DeBoer 1974) studies of refuse.

Some of the more recent functional studies (Braun 1982a, 1982b; Erickson et al. 1971; Steponaitis 1983) have concentrated on the technological attributes of ceramics, using various mechanical and physical tests to measure vessel response to heat and mechanical stress. Experimental tests have helped to define paste and temper correlates useful in diachronic studies of vessel form (Braun 1982a, 1982b). Synchronic analyses of specific assemblages (Steponaitis 1983) have focused on the differentiation of cooking, storage and eating/serving vessels.

Functional analyses of ceramics have been used to infer activity loci by combining information about vessel use with context. From assemblages associated with different architectural features, functional vessel types have been correlated to infer the nature of the activities and the sociocultural context within which they occurred (Lischka 1978). The particular types of activities associated with domestic structures can be inferred by the distribution of morphological vessel types (Hally 1983a).

Among Caddoan researchers, ceramic functional analyses have received relatively little attention. One of the earliest such efforts was A.T. Jackson's (1934) study of 2000 whole vessels from 16 northeast Texas counties (1934:41-42). Jackson, unaware of the cultural and temporal variations now recognized for these collections, analyzed the vessels in terms of three criteria which clearly relate to vessel use: presence of sooting, vessel shape and the presence of appendages for handling. Using similar attributes, Brown (1971) studied the vessels from Spiro for functional data related to their use. Unlike Jackson, Brown's approach was explicitly diachronic, as he demonstrated changes through time in cooking vessels and in assemblage diversity.

Two of the best functional analyses of ceramics for Caddoan sites have stemmed from salvage projects with well-conceived research designs. Functional data were gathered to determine the intra- and intersite homogeneity in past activities at sites in the Lake Fork Reservoir. In lieu of specific activity loci, the functional equivalency of ceramics from artifact clusters (some of which are directly associated with features) was examined (Bruseth and Pertulla 1981:70). Ethnohistoric sources were used in part to predict the kinds of vessels associated with different types of sites in the settlement scheme proposed by Anderson et al. (1974) for the Lake Palestine survey.

Recent attempts to alert Caddoan scholars to the merits of functional studies have been made (Shafer 1981; Taylor 1982). Shafer is one of the few recent Caddoan researchers to apply a functional approach. He (1981:167) emphasized form, kind of decoration, and the presence of organic residue as the best indicators of function. He also stressed that assemblages in different contexts (i.e., midden vs. mortuary) have different behavioral implications, a concept also voiced by Schambach and Miller (1983). Shafer (1981:167) reasoned that few functional studies have been carried out thus far in the Caddoan area because of the humid environment in East Texas which results in poor preservation of use-related wear and residue, inadequate ethnohistoric information pertaining to Caddoan use of ceramic vessel forms, and the paucity of primary function contexts (burials being the only exception).

Rationale for Thesis Problem

Significant inferences about intersite and intrasite activities can be drawn from the functional characteristics of ceramic assemblages.

The Caddoan settlement pattern models of McCormick (1973a) and Anderson et al. (1974), for example, depend to a large extent on variations in ceramic assemblages to predict differences in types of sites and activities. Anderson et al. (1974) proposed that intersite differences in vessel assemblages could be used to discriminate between temporary camps and permanent settlements. McCormick's (1973a) model distinguished between two types of permanent settlements: habitation sites (i.e., those having evidence of structures) and ceremonial centers (i.e., those having evidence of mounds). While McCormick did not specify the artifacts he expected to be found at each type of site, he did predict that two different assemblages would be found at ceremonial centers. Artifacts, he noted (1973a:14)

> recovered from the area around the mounds will be expected to be similar in content to assemblages from villages and seasonal sites as it [the area around the mounds] would reflect the remains of people "camping" at the site during ceremonies. Material recovered from the mounds should not represent daily maintenance activities, but rather more specialized activities....

McCormick's hypothesis parallels the "sacred vs. secular" argument advanced by Sears (1973). Sears' thesis is based on a dichotomy of contexts at mound sites; "sacred" contexts are those from mounds (usually burial mounds), while those from midden contexts are considered "secular." Restricted to each context are specific ceramic assemblages, which are distinguished from one another by surface decoration, vessel form, and the degree of craftsmanship (1973:31-34). Like McCormick, Sears recognized the existence of intrasite ceramic differences at ceremonial sites, but, unlike McCormick, he imputes behavioral meaning to the contexts rather than to the activities represented by the artifacts.

Despite the simplistic nature of Sears' thesis, he states well the implicit assumptions regarding the distribution of ceramics at mound sites. His assumptions are indirectly tested in this study of the ceramics from the Whelan site.

On the basis of the four mounds and the special purpose buildings associated with at least one of these mounds, Whelan readily qualifies as a ceremonial center. The questions, then, to be asked are: 1) does the ceramic collection reflect "ceremonial" or "sacred" activities? 2) what are the types of activities represented by the Whelan collection? 3) are these activities specific to mound or non-mound contexts?

Study Methods

The initial thrust of this thesis is a grouping of the vessel ceramics by decorative technique and a typological analysis to determine the cultural affiliation and temporal placement of the site. All sherds are sorted by decorative technique, but only about 6% of them are typable. Typological categories are set up to indicate the probable origin of the identified types, and consist of indigenous, possible indigenous, and presumed trade groups.

This section is followed by a functional analysis of those portions of the collection that can be sorted by vessel batches. Defined as sherd groups that comprise individual vessels, vessel batches are used because they have greater analytical value than sherd counts in approximating the minimum number of vessels used at the site. These vessel batches are studied in terms of functional attributes that yield information on vessel shape, size, and suitability to withstand heat or mechanical stress.

Summary

The preceding literature review indicates that ceramics constitute a useful data base for functional interpretations. Through a functional analysis of the ceramics, a primary goal of this thesis is to examine several questions related to the activities that occurred at Whelan, a ceremonial site.

Chapter 6

CERAMIC ANALYSIS

The vessel ceramic collection from the Whelan site consists of 13,578 sherds. Also recovered from the site, but not dealt with in this study, are 130 non-vessel ceramic specimens: 54 pieces of daub, 39 pieces of thermally altered clay, 18 perforated discs, 9 pipe fragments, 4 vessel appendages, 2 possible pipe fragments, 2 effigy fragments, and 2 lumps of clay with basketry impressions.

The sherd collection, which is useful for defining the cultural and temporal affiliations of the Caddoan component at Whelan, is classified by decorative technique and, when possible, type. In addition, these identified types and several untyped but distinctive sherds are further sorted into three groups based on their probable origin: indigenous, possible indigenous, and presumed trade. This aspect of my study has yielded results that are comparable to those produced by other traditional approaches to sherd collections from Caddoan sites.

The specimens which could be assigned with reasonable confidence to individual vessels constitute the vessel batch collection. Although only 737 sherds (5.6% of the total collection) could be attributed to 422 vessels, much of my analysis has focused on these ceramics because of their usefulness in interpreting site function and in identifying intrasite activity areas.

The Sherd Collection

Prior to this study, the Whelan site ceramics had undergone a preliminary typological analysis by Davis (1958:50-64). In the present analysis, all the sherds - except for 435 specimens that lack catalogue numbers or that have severely damaged surfaces - have been resorted. I did all of the resorting and repeatedly checked each grouping to insure its internal consistency.

All of the 13,143 specimens that constitute the analyzed sherd collection were classified by decorative technique. The main categories recognized are: 1) undecorated, 2) incised, 3) punctated, 4) brushed, 5) engraved, 6) slipped and 7) miscellaneous wet paste. The last-named category consists of these treatments: appliqued, combed, pinched, trailed, neck banded, stamped, and ridged. Appendix I provides definitions of each category.

Table 2 presents the counts and frequencies of the sherd collection separated by decorative treatments. Plain sherds dominate the collection, accounting for 39% of the total; brushed sherds are almost as common, totalling 37.7% of the collection. The least frequent treatments are those of slipping and miscellaneous wet paste. Yet the combined total of all wet paste categories (i.e., brushed, incised, punctated, and miscellaneous wet paste) is 6702 specimens, accounting for 51% of all the decoration.

The subsequent separation into types was based on the definitions found in the following sources: Bohannon (1973), Newell and Krieger (1949), Suhm and Jelks (1962), Thurmond (1981) and Webb (1959, 1983).

TABLE 2

SHERD COUNTS AND FREQUENCIES BY DECORATIVE TECHNIQUE

		Number	Percent
Undecorated		5126	39.0
Brushed		4955	37.7
Incised		1238	9.4
Engraved		1165	8.9
Punctated		338	2.6
Slipped		150	1.1
Miscellaneous wet paste:		171	1.3
Appliqued	57		
Pinched	47		
Neck Banded	25		
Ridged	14		
Trailed	11		
Combed	7		
Combed and Trailed	5		
Combed and Pinched	3		
Stamped	2		
TOTAL		13,143	100.0

Type identifications are usually based on rim treatments, but body treatment is also important in defining the types Pease Brushed-Incised, Sinner Linear Punctated and Harleton Applique. No new types or varieties are evident, but types rarely identified in East Texas collections are found.

Table 3, showing the frequency of each type and decorative class, plainly demonstrates the prevalence of types Ripley Engraved, Pease Brushed-Incised and Maydelle Incised. These counts, however, cannot adjust for the fact that some types are easier to identify in sherds than others. Ripley Engraved and Pease Brushed-Incised, for example, are easily sorted by their distinctive elements and designs, even on small sherds. Maydelle Incised, on the other hand, may be underrepresented in the sherd totals because a larger portion of the design is necessary for accurate type determination. Despite this inherent bias in typing sherds, the prevalence of these types agrees with Thurmond's (1981:92) criteria for a Whelan Phase site.

In Table 3 the sherd collection is divided by presumed origin into indigenous, possible indigenous, and presumed trade groups. The criteria for classification includes the relative frequencies of each type and decorative technique, as well as unusual characteristics of paste or decoration. The level of confidence for group inclusion varies between and within groups. Obviously, the typable specimens are more securely assigned to groups than are the sherds defined only by decorative technique. Among the three major groups, the indigenous and presumed trade ceramics were more reliably sorted than the possible indigenous group. Following the definitions for each of the three groups,

TABLE 3

TYPES AND UNTYPED DECORATIVE TECHNIQUES GROUPED BY PROBABLE ORIGIN

Indigenous ceramics		Number	Percent
Pease Brushed-Incised		425	3.2
Ripley Engraved		195	1.5
Undecorated		5126	39.0
Untyped brushed		4606	35.1
Untyped incised		1095	8.3
Untyped punctated		327	2.5
SUBTOTAL		11,774	89.6
Possible indigenous ceramics			
Maydelle Incised		66	.5
LaRue Neck Banded		25	.2
Harleton Applique		12	.1
Untyped engraved		965	7.3
Untyped slipped		140	1.1
Untyped misc. wet paste:		109	.8
Appliqued	45		
Pinched	44		
Trailed	11		
Combed	7		
Ridged	2		
SUBTOTAL		1317	10.0
Presumed trade ceramics			
Barkman Engraved		13	.1
Belcher Ridged		12	.1
Sinner Linear Punctated		11	.1
Washington Stamped/Combed		5	<.1
Killough Pinched		3	<.1
Holly Fine Engraved		2	<.1
Glassell Engraved		1	<.1
Untyped misc. wet paste:		5	<.1
Combed and pinched	3		
Stamped	2		
SUBTOTAL		52	.4
TOTAL:		13,143	100.0

descriptions for each type and distinctive decorative technique are given.

Indigenous ceramics are those considered to have been produced at or near the Whelan site. Consequently, this group is comprised of those types and decorative technique categories present in the highest frequencies. Two types and four decorative classes (Table 3) account for 89.6% (N=11,774) of the entire collection analyzed from the site.

Presumed trade ceramics include both typed and untyped, distinctive specimens that are either recognized as trade pieces for the Titus Phase, or are anomalous in paste or decoration when compared to the other Whelan site ceramics. Seven types and two distinctive decorative classes comprise the 52 specimens of this group, which accounts for only .4% of the collection.

Possible indigenous ceramics include those types considered indigenous for the Titus Phase and those decorative classes which cannot be confidently assigned to the indigenous group because of low representation (i.e., untyped miscellaneous wet paste) or because of uncertain origin (i.e., untyped engraved and slipped). Three types and three decorative treatment classes comprise this group, which makes up 10% (N=1316) of the total sherd collection.

Indigenous Types

Pease Brushed-Incised (N=425; Fig. 11-12, all pictured specimens). This type is identified solely by its particular body treatment, generally consisting of vertical applique strips or punctations separating panels of brushed or incised lines. The range of variation in execu-

FIGURE 11

INDIGENOUS TYPES: PEASE BRUSHED-INCISED

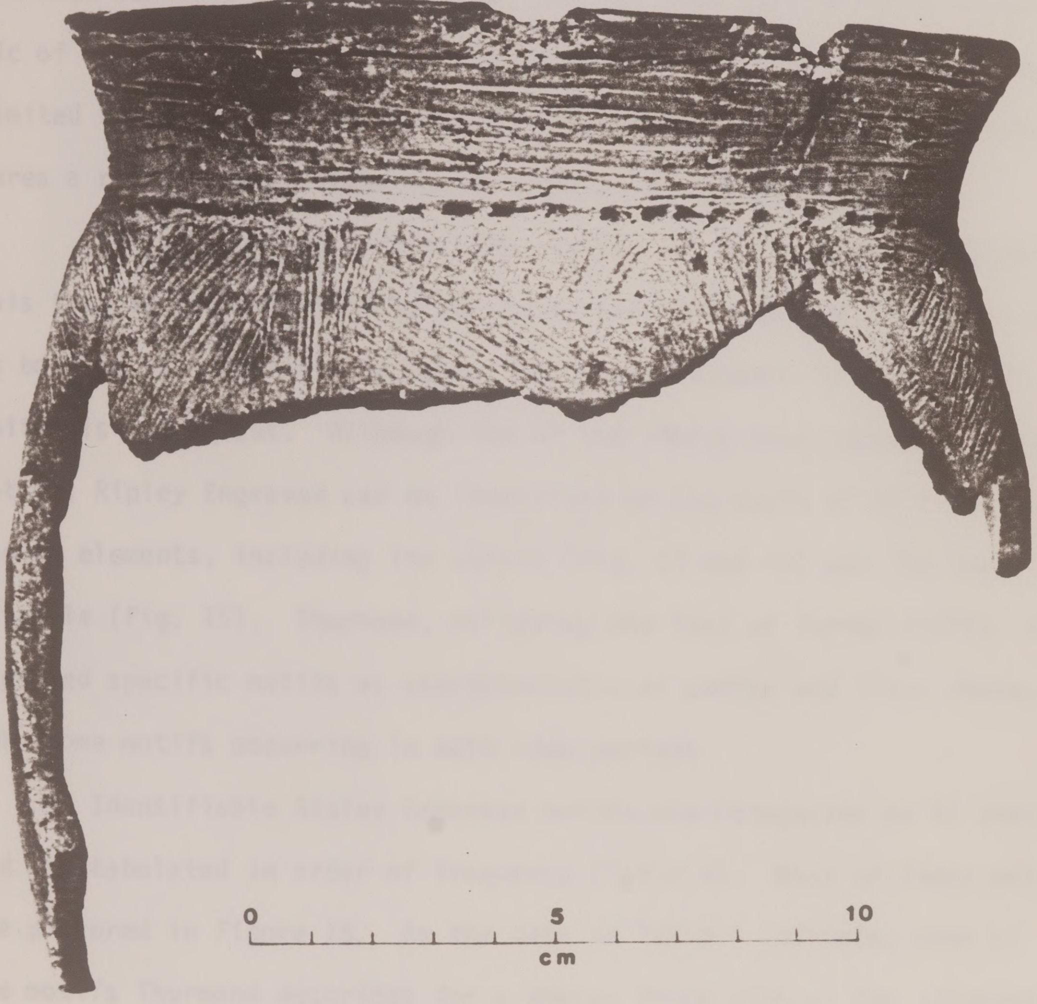
All pictured specimens are probably from jars.


0
5
10
cm

FIGURE 12

INDIGENOUS TYPES: PEASE BRUSHED-INCISED

Note the elongated body and everted rim of this reconstructed vessel.


0
5
10
cm

tion and in design elements is visible in Figure 11. Associated rim treatments are apparent on four vessel batches; one has horizontal incising, two have horizontal brushing and one is undecorated. This is the most numerous type at the site, and has been designated as diagnostic of the Bossier Focus (Webb 1948:137; 1983). Identified shapes are limited to jar forms, which usually have everted rims. Figure 12 pictures a reconstructed Pease vessel with an elongated body.

Ripley Engraved (N=195; Fig. 13-15, 17, all pictured specimens). This type is characterized by carinated and compound bowl forms, as well as bottles of indeterminate form. The use of pigment (either red or white) is infrequent. Although few of the sherds have complete design motifs, Ripley Engraved can be identified on the basis of distinctive design elements, including the scroll (Fig. 13 and 14) and the pendant triangle (Fig. 15). Thurmond, following the lead of Turner (1978), designated specific motifs as characteristic of Whelan and Titus Phases, with some motifs occurring in both time periods.

Identifiable Ripley Engraved motifs are recognized on 82 sherds, and are tabulated in order of frequency (Table 4). Most of these motifs are pictured in Figure 16. As the data in Table 4 indicate, some of the motifs Thurmond describes for a Whelan Phase site -- the alternating nested triangle, and the interlocking horizontal scroll -- are not identified from the Whelan assemblage. More importantly, the pendant triangle motif (Fig. 15), limited to Titus Phase sites, is represented at the Whelan Site, accounting for almost 10% (N=8) of the Ripley motifs on sherds. The occurrence of this motif at Whelan suggests a temporal overlap with the Titus Phase.

FIGURE 13

INDIGENOUS TYPES: RIPLEY ENGRAVED

A = Circle and nested triangle motif on a carinated bowl.

B = Continuous scroll motif on a probable bowl.

C = Scroll and circle motif on a probable bowl.

D = Continuous scroll motif on a probable bowl.

E = Scroll motif on a carinated bowl.

Motif determinations are based on motifs pictured in Figure 16.


A
B
C
D
E
0
5
10
cm

FIGURE 14

INDIGENOUS TYPES: RIPLEY ENGRAVED

A,B = Scroll and circle motif on a carinated bowl.

Motif determinations are based on motifs pictured in Figure 16.

A

B

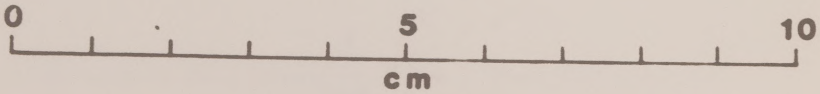


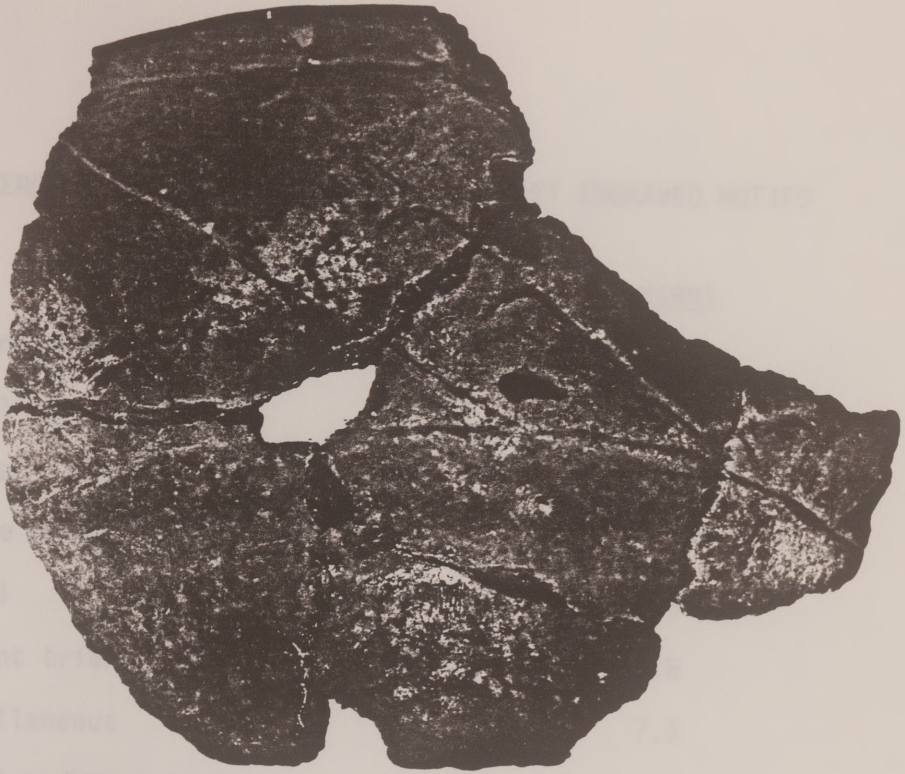
FIGURE 15

INDIGENOUS TYPES: RIPLEY ENGRAVED

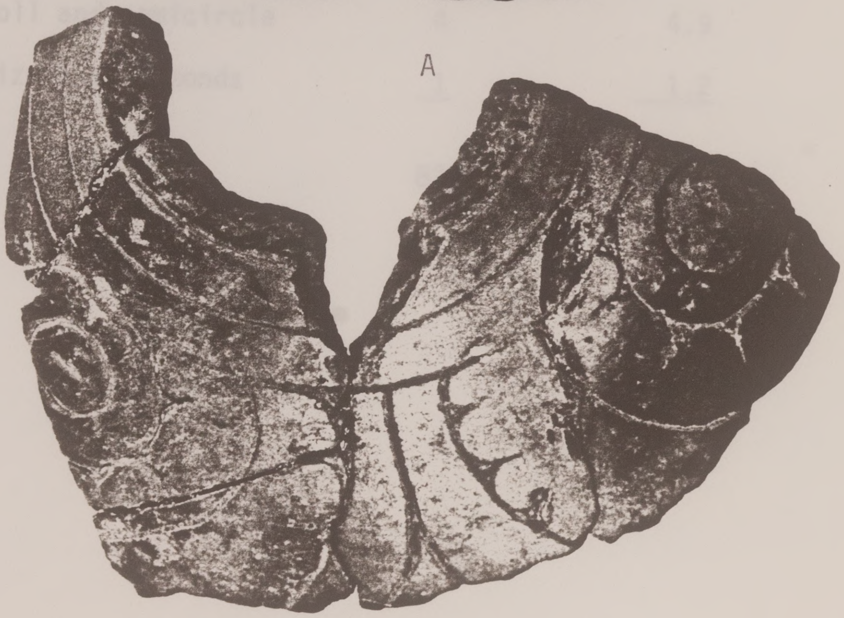
A = Pendant triangle motif on a slightly carinated bowl.

B = Pendant triangle motif on a bottle of indeterminate form.

Motif determinations are based on motifs pictured in Figure 16.



A



B

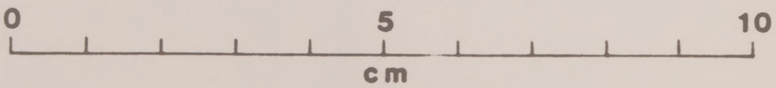


TABLE 4

SHERD COUNTS AND FREQUENCIES OF RIPLEY ENGRAVED MOTIFS

	Number	Percent
Continuous scroll	16	19.5
Scroll and circle	16	19.5
Circle	13	15.9
Circle w/nested triangle	10	12.2
Scroll	8	9.8
Pendant triangle	8	9.8
Miscellaneous	6	7.3
Scroll and semicircle	4	4.9
Horizontal diamonds	1	1.2
TOTAL:	82	100.0

FIGURE 16

RIPLEY ENGRAVED MOTIFS

A = Pendant triangle

B = Scroll

C = Scroll and circle

D = Scroll and semicircle

E = Circle and nested triangle

F = Continuous scroll

G = Interlocking horizontal scroll

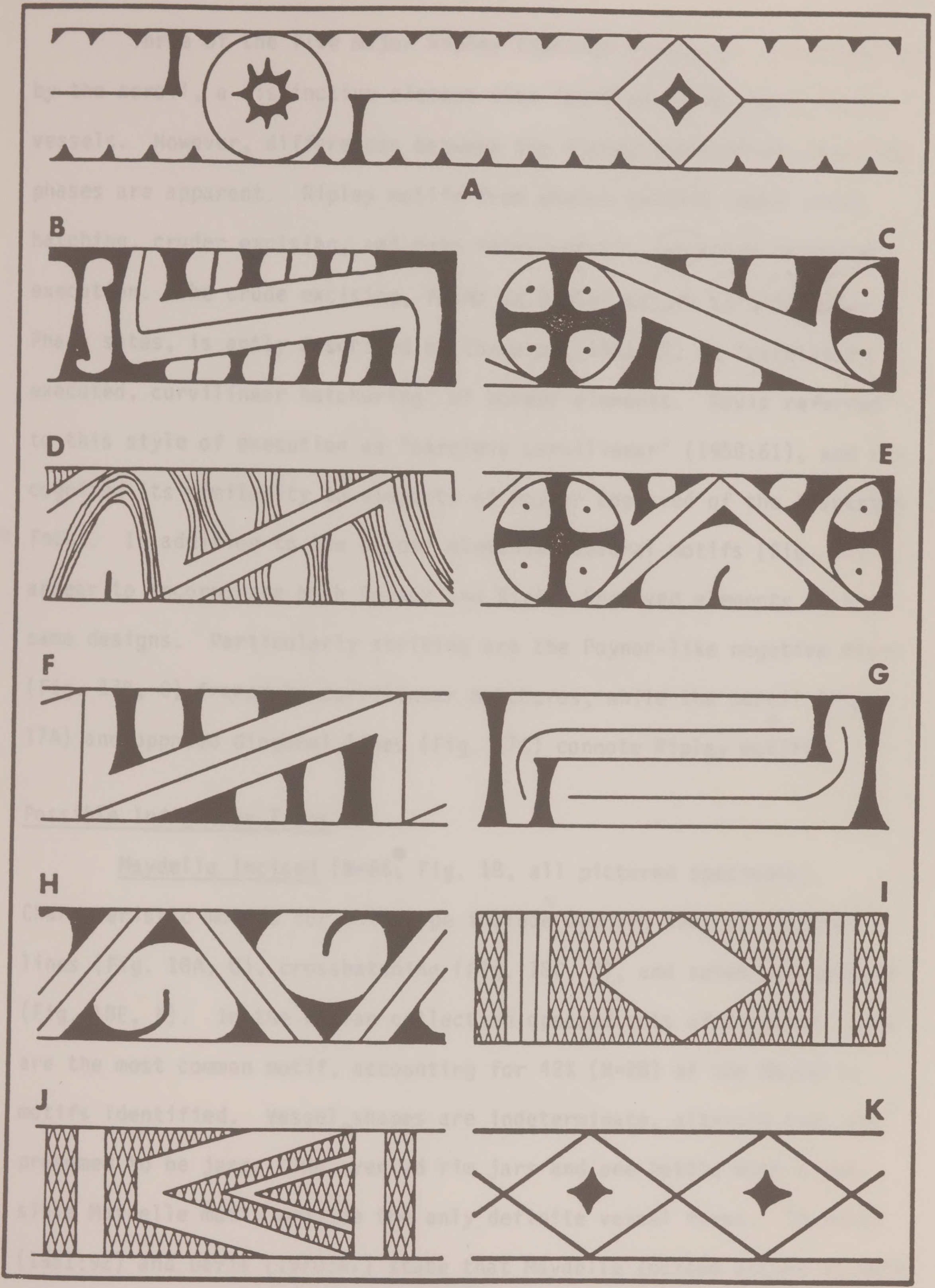
H = Alternating nested triangle

I = Horizontal diamond

J = Bisected diamond

K = Interlocking diamond

From Thurmond (1981:Fig. 6).


A
B
C
D
E
F
G
H
I
J
K

Three of the five major Ripley Engraved motifs are characterized by the scroll, a distinctive element also found on Titus Phase Ripley vessels. However, differences between the Ripley Engraved of these two phases are apparent. Ripley motifs from Whelan exhibit more cross-hatching, cruder excising, amd more idiosyncratic variation in design execution. The crude excising, found in Ripley motifs at all Whelan Phase sites, is aptly described by Thurmond (1981:92) as "carelessly executed, curvilinear hatchuring" of border elements. Davis referred to this style of execution as "careless curvilinear" (1958:61), and recognized its similarity to elements of Poynor Engraved of the Frankston Focus. In addition to the border elements, several motifs (Fig. 17) appear to incorporate both Poynor and Ripley Engraved elements in the same designs. Particularly striking are the Poynor-like negative discs (Fig. 17B, C) framed by curvilinear hatchures, while the scroll (Fig. 17A) and opposed diagonal lines (Fig. 17C) connote Ripley motifs.

<u>Possible Indigenous Types</u>

<u>Maydelle Incised</u> (N=66; Fig. 18, all pictured specimens). Characteristic motifs for this type include opposed sets of diagonal lines (Fig. 18A, B), crosshatching (Fig. 18C, D), and zoned punctations (Fig. 18E, F). In the Whelan collection opposed sets of diagonal lines are the most common motif, accounting for 42% (N=28) of the Maydelle motifs identified. Vessel shapes are indeterminate, although they are presumed to be jars. Two everted rim jars and one bottle with a possible Maydelle motif provide the only definite vessel forms. Thurmond (1981:92) and Davis (1970:47) state that Maydelle Incised occurs at both

FIGURE 17

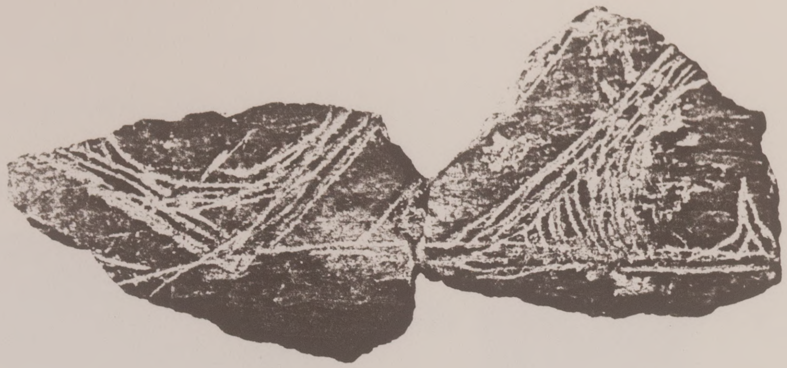
INDIGENOUS TYPES: RIPLEY ENGRAVED

A = Scroll motif on a carinated bowl.

B = Circle motif on a probable bowl.

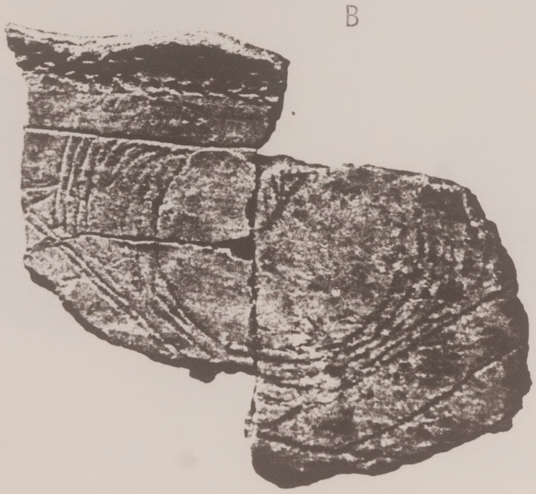
C = Circle and nested triangle motif on a carinated bowl.

Motif determinations are based on motifs pictured in Figure 16.



A

B



C

0 5 10
cm

FIGURE 18

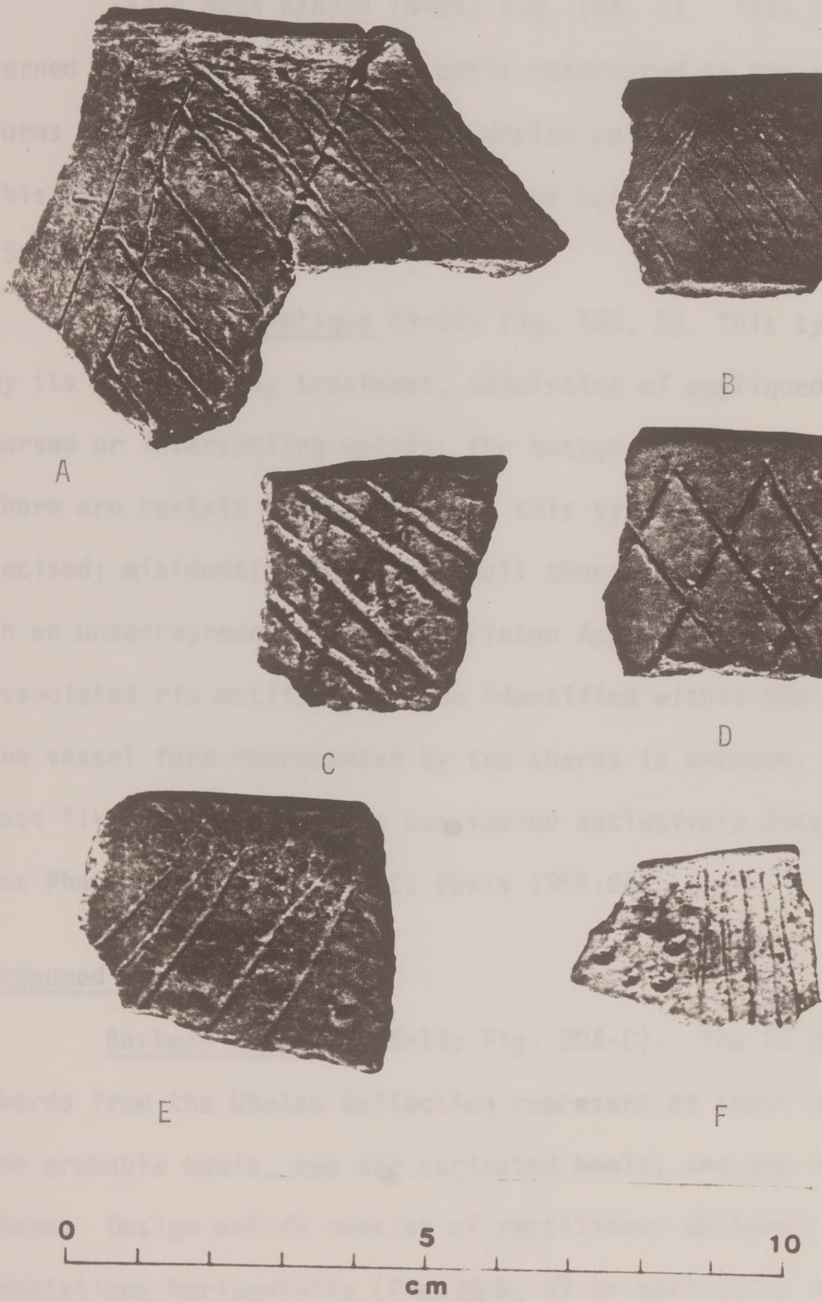
POSSIBLE INDIGENOUS TYPES: MAYDELLE INCISED

A, B = Opposed sets of diagonal lines motif.

C, D = Crosshatched lines motif.

E, F = Zoned punctations motif.

All specimens are probably from jars.



A
B
C
D
E
F
0
5
10
cm

Whelan and Titus Phase sites. Its high frequency relative to the other possible indigenous types strongly suggests its resident status at Whelan.

<u>LaRue Neck Banded</u> (N=25; Fig. 19A, C). This type is easily discerned by its unique crimped coils restricted to the neck. No vessel forms are identifiable from the Whelan collection, but jars are assumed. This type is considered diagnostic of both the Titus and Frankston Foci (Suhm and Jelks 1962:93).

<u>Harleton Applique</u> (N=12; Fig. 19D, E). This type is recognized by its unusual body treatment, consisting of appliqued strips placed in curved or intersecting motifs; the background is either brushed or plain. There are certain similarities in this type to that of Pease Brushed-Incised; misidentification of small sherds is possible and could result in an underrepresentation of Harleton Applique (Thurmond 1981:401). No associated rim motifs have been identified within the Whelan collection. The vessel form represented by the sherds is unknown, although jars are most likely. This type is considered exclusively diagnostic of the Titus Phase (Thurmond 1981:92; Davis 1958:64).

<u>Presumed Trade</u>

<u>Barkman Engraved</u> (N=13; Fig. 20A-C). The 13 Barkman Engraved sherds from the Whelan collection represent at least six vessels; three are probable bowls, two are carinated bowls, and one is of unknown shape. Design motifs consist of rectilinear patterns having a row of punctations horizontally (Fig. 20 B, C) or vertically positioned (Fig. 20A). This type apparently is associated only with the Texarkana Focus

FIGURE 19

POSSIBLE INDIGENOUS AND PRESUMED TRADE TYPES:
LARUE NECK BANDED, HARLETON APPLIQUE AND KILLOUGH PINCHED

A, C = LaRue Neck Banded.

B = Killough Pinched.

D, E = Harleton Applique.

All specimens are probably from jars.


A
B
C
D
E
0
5
10
cm

FIGURE 20

PRESUMED TRADE TYPES: BARKMAN ENGRAVED

A = Carinated bowl.

B,C = Probable bowls.


A
B
C
0
5
10
cm

(Suhm and Jelks 1962:7). It is rarely found as trade pieces in sites of other cultural manifestations.

Belcher Ridged (N=12; Fig. 21B). Six of the Belcher Ridged sherds come from a single vessel that is probably a jar. The decoration consists of vertical rows of thin ridges; no associated rim treatments are noted in the Whelan Collection. This type spans a time range from late Alto Focus or early Bossier Focus through Belcher Focus (Webb 1983:193).

Sinner Linear Punctated (N=11; Fig. 21A). All 11 sherds are from a single vessel, presumed to be a jar. The diagonal rows of closely spaced elongate punctations characterize the type. It is considered diagnostic of the Bossier Focus (Webb 1983:193).

Washington Stamped/Combed (N=5; Fig. 22B, D). All five sherds of this type derive from one jar having a sharply everted rim and globular body. The type is tentatively defined on the basis of vessels from the Washington site (Harrington 1920:Plate LIII) in southwestern Arkansas. Decoration consists of trailed curvilinear bands against a combed background. The type is common in the Little Missouri River region of Arkansas (Dr. Frank F. Schambach, personal communication 1984), and has been found as far south as the Great Bend of the Red River at the Battle Mound and Cedar Grove sites. Schambach considers the type to be a potentially good Caddo III indicator.

Killough Pinched (N=3; Fig. 19B). These three fragments are from a single everted rim jar. This is primarily a Frankston Focus type, but it occurs occasionally in Titus Phase sites.

FIGURE 21

PRESUMED TRADE TYPES: SINNER LINEAR PUNCTATED AND BELCHER RIDGED

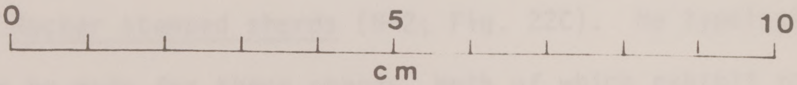
A = Sinner Linear Punctated.

B = Belcher Ridged.

All specimens are probably from jars.

A

B



Holly Fine Engraved (N=2). The two sherds found at Whelan represent separate vessels, one of which is a carinated bowl. Both sherds exhibit the vertical fine engraving characteristic of the type, which is recognized as an Alto Focus diagnostic. The persistence of Alto Focus ceramics into Bossier Focus components is noted, although Holly is rarely one of these residual types (Webb 1983:194).

Glassell Engraved (N=1). This sherd is from a carinated bowl, and has a stepped rectilinear design bisected by a ticked line. Arched hatchures on each vertical divider round out the upper and lower panels. This type is considered primarily a Belcher Focus type, but is also found at Titus Phase sites.

Combed and pinched vessel (N=3; Fig. 22A). These three sherds comprise part of a single everted rim; the body form is unknwon. Decoration consists of crude curvilinear combing that defines an undecorated area bisected by a line of pinching. The paste is the most unusual aspect of the vessel; it includes round, black, shiny nodules that have been tentatively identified under a polarizing microscope as shale (McCrone and Delly 1973:399-400). Such a paste is unique and anomalous in the Whelan site collection and makes the vessel's trade status certain. Schambach (personal communication 1984) stated that the type is not familiar to southwest Arkansas. Brown (1971:69) mentions shale-tempered ceramics at Sprio but does not describe a design or vessel form similar to this one.

Rocker stamped sherds (N=2; Fig. 22C). No typological affiliation can be made for these sherds, both of which exhibit rocker stamped areas bounded by wide trailed lines. Both are also coarsely tempered

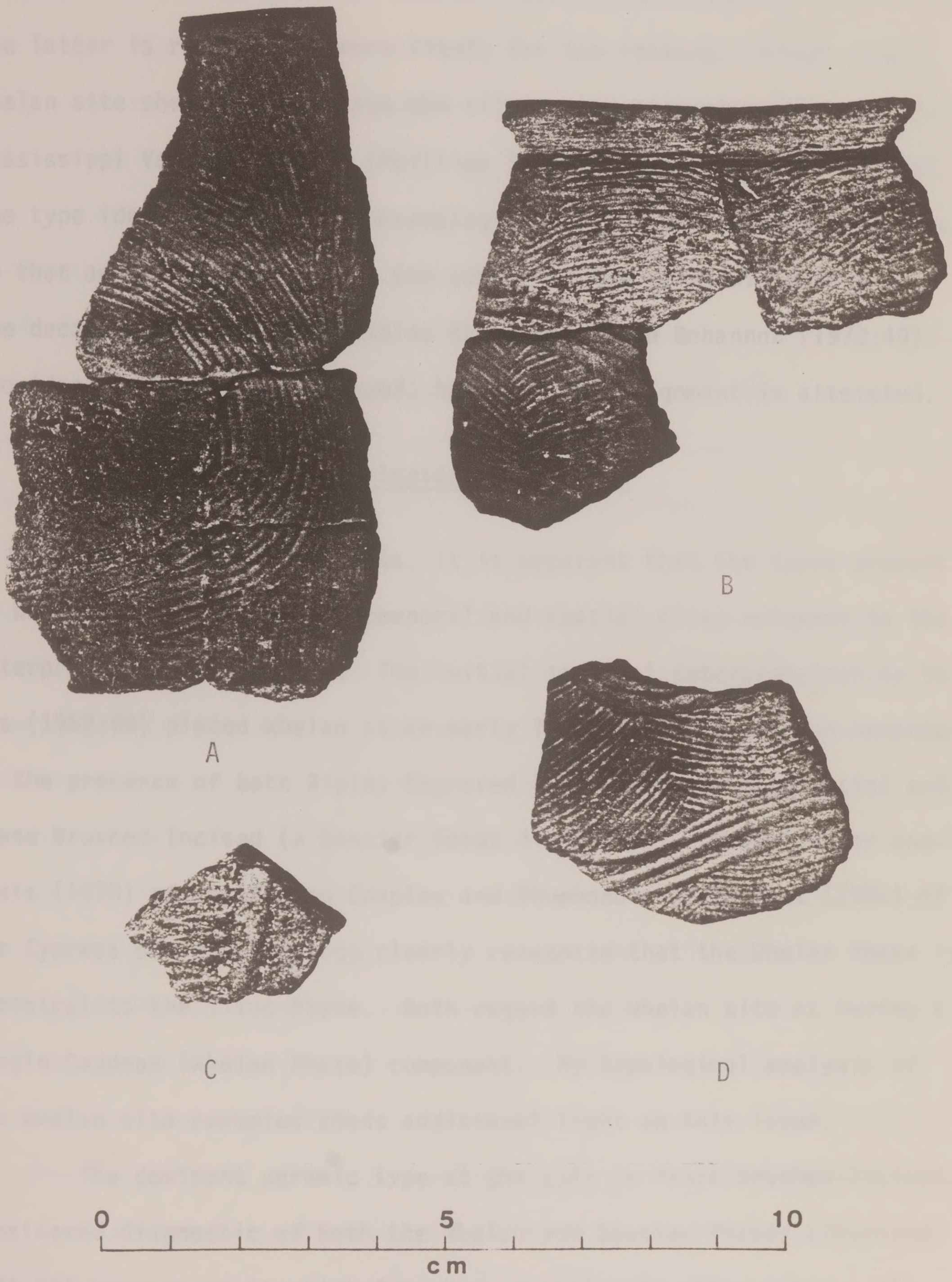
FIGURE 22

PRESUMED TRADE TYPES AND UNTYPABLE TRADE SPECIMENS:
WASHINGTON STAMPED/COMBED AND DISTINCTIVE DECORATIVE TECHNIQUES

A = Untyped combed and pinched rim sherd from an everted rimmed jar.

B, D = Washington Stamped/Combed jar with sharply everted rim and globular body.

C = Untyped rocker stamped sherd from a vessel of indeterminate shape.


A
B
C
D
0
5
10
cm

with bone. Although the Lower Mississippi Valley and the southwestern area of Arkansas are possible source areas for this type of decoration, the latter is regarded as more likely for two reasons. First, these Whelan site sherds do not have the silty paste characteristic of Lower Mississippi Valley ceramics (Phillips 1970). Second, there is already one type identified in this assemblage from the southwest Arkansas area, so that additional types from the same area are certainly possible. The decoration somewhat resembles the description Bohannon (1973:49) provides for Washington Stamped, but no type assignment is attempted.

Typological Discussion

From the preceding data, it is apparent that the types present at Whelan provide important temporal and spatial clues relevant to the interpretation of the site. The initial temporal interpretation by Davis (1958:68) placed Whelan as an early Titus Phase occupation because of the presence of both Ripley Engraved (a Titus Phase diagnostic) and Pease Brushed-Incised (a Bossier Focus diagnostic). Davis' later analysis (1970) of the Whelan Complex and Thurmond's assessment (1981) of the Cypress Basin chronology clearly recognize that the Whelan Phase is ancestral to the Titus Phase. Both regard the Whelan site as having a single Caddoan (Whelan Phase) component. My typological analysis of the Whelan site ceramics sheds additional light on this issue.

The dominant ceramic type at the site is Pease Brushed-Incised, considered diagnostic of both the Whelan and Bossier Phases (Thurmond 1981:92) because of its high frequency relative to other types. Its presence in both phases implies their contemporaneity. Two other Bossier Focus types found at Whelan are Sinner Linear Punctated and Belcher Ridged, both of which are present in low frequencies. Together with the single Glassell Engraved sherd (attributed to the Belcher Focus) they comprise the total presumed trade pieces from the Bossier and/or Belcher Foci.

The next most abundant type is Ripley Engraved, which is considered diagnostic of both the Whelan and Titus Phases (Thurmond 1981; Davis 1970). According to criteria set up by Thurmond (ibid:92), Ripley Engraved assemblages from Whelan and Titus Phase sites can be differentiated by their motifs. This pattern does not hold true for the Whelan site, at which both "Titus" and "Whelan" Ripley Engraved motifs are present (Table 4).

This apparent overlap with the Titus Phase is corroborated at the Whelan site by the infrequent occurrence of several Titus Phase types (Harleton Applique and LaRue Neck Banded) and the relatively high frequency of Maydelle Incised. In particular, the presence of Harleton Applique is significant because Thurmond (ibid:440) documented its occurrence at three other Whelan Phase mound sites, which he classified as transitional Whelan to Titus Phase to account for the presence of this type. By his criteria, the Whelan site should also be so classified chronologically, thereby changing the Whelan Phase placement to which it was assigned. This change would also result in classifying as transitional four of the five mound sites within the Whelan Phase.

A different solution has been reached for Bossier Focus assemblages, many of which contain Belcher Focus types. Webb (1983:222) broadens the ceramic trait list of the Bossier Focus to include earlier

(Alto Focus) and later (Belcher Focus) types to indicate the occurrence of residual or incipient types. He differentiates Bossier Focus assemblages by the terms "early" or "late" when a sizeable percentage of non-contemporaneous types are present in a site's ceramic inventory. This alternative is appropriate for the temporal overlap suggested by the particular types found at Whelan. Therefore, I propose that the temporal placement of the Whelan site be Late Whelan Phase according to Webb's scheme, rather than transitional Whelan to Titus Phase according to Thurmond's terminology.

Complementary temporal information can be derived from the trade pieces originating in the Texarkana and southwest Arkansas areas. The Texarkana Focus, variously designated a Caddo IV manifestation or a Caddo III period (Table 1), is a poorly defined complex described on the basis of a few sites (Suhm et al. 1954:204). The Barkman Engraved sherds found at Whelan are considered diagnostic of this cultural unit, which is located near the Great Bend of the Red River. Either temporal designation for the sherds is consistent with the Late Whelan Phase assignment for the Whelan site. In addition, the Washington Stamped/Combed vessel, originating from southwest Arkansas, has been tentatively attributed to the Caddo III period, which is considered temporally equivalent to the Whelan Phase (Table 1). Thus, the presumed trade types originate from phases considered contemporaneous with the Whelan Phase and further support the temporal placement of this site.

These types also indicate that the strongest contact appears to have been from areas northeast of Whelan: the Great Bend of the Red River, southwest Arkansas and northwest Louisiana. The majority of trade sherds derive from the Bossier Focus and the Texarkana Focus, both complexes situated along the Red River mainstream. The Washington Stamped/Combed vessel originated from southwest Arkansas, the area farthest from Whelan. Schambach (personal communication 1984) reports that Whelan is the southwesternmost site at which this type has been found. Contact with these cultural groups may have been facilitated by Whelan's location on a major Red River tributary.

Stylistically, some of the ceramic motifs, particularly in the Ripley Engraved designs, may stem from designs associated with the Frankston Focus, located southwest of Whelan. Although no definite trade pieces can be identified from this complex, stylistic similarities to Poyner Engraved motifs (Fig. 16) suggest that interaction occurred. However, the major stylistic impetus seems to be from the Bossier Focus, from which an indigenous and several presumed trade types originated. It is also possible that the Bossier Focus contributed more than ceramic concepts to the Whelan site and Whelan Phase. Indigenous developments related to the Bossier Focus have been identified in the Angelina Focus along the Angelina River in southeast Texas and the Camden Complex along the Ouachita River in south-central Arkansas (Webb 1983-196). A similar development, occurring along the Cypress, may have resulted in the complex of traits now known as the Whelan Phase.

Vessel Batch Analysis

Vessel batches, defined simply as groups of sherds from the same vessel, are the basic tools of my functional analysis of the Whelan site ceramics. The value of vessel batches was originally advanced by Krieger (Newell and Krieger 1949) as a means of estimating the minimum number of vessels at a site in order to evaluate more accurately the prevalence of types. In addition, they can be used to determine the range of vessel shapes, and from this, to infer the nature and range of activities occurring at a site. Thus, a vessel batch analysis carries more behavioral significance than one using sherd counts.

The attributes upon which the analysis is based are designed to reflect primarily functional information. This information includes the types of vessels, the vessel size categories and the number of cooking vessels. The suitability of cooking vessels to withstand heat or mechanical stress is also discussed. From this data, inferences are made regarding the kinds of activities occurring at the Whelan site.

Method of Vessel Batch Selection

Separation of sherds into vessel batches is done on the basis of decorative technique, motif, shape, paste or temper similarities. From the entire sherd collection, 5.6% (N=737) of the specimens could be attributed to 422 vessel batches. Of the recognized vessel batches, 287 (68%) are based on single sherds and the remainder (N=135) on two or more sherds that comprised vessels between 5 and 50% complete. No complete vessels were recovered from the site.

With the one exception noted below, I followed Krieger's precedent (Newell and Krieger 1949:76) in using only rim sherds to define vessel batches because they are the most easily identified vessel part. They also carry the greatest number of unique attributes found on a vessel. A rim is defined as the uppermost section of a vessel having a lip or an everted or compound curvature, or as the junction between rim and body sections. Not all rim sherds constitute separate vessel batches; many are not distinctive enough to assign confidently as a separate vessel.

Eliminated from the vessel batch count are groups of body sherds lacking a rim, primarily because they cannot be matched with rims due to design differences on both vessel parts (Rolingson and Schambach 1980). This non-inclusion of body sherds resulted in a low representation of the types (i.e., Pease Brushed-Incised, Sinner Linear Punctated and Harleton Applique) that are discriminated by body treatment alone. I employed Kleinschmidt's (1982:97) criterion of using bottle bodies rather than bottle rims, since most diagnostic bottle design traits are found on the body sherds. Krieger (Newell and Krieger 1949:75) and Brown (1971:4) narrowly define vessel batches as groups of sherds having enough pieces to judge the appearance of the entire vessel. Since there are few vessel batches from the Whelan collection that complete, I broadened my criteria for vessel batch inclusion to accommodate the realities of my collection.

The limitations to my vessel batch sort are twofold. I may err in estimating the minimum number of vessels, though probably on the conservative site. More time could have been spent in sorting to determine additional vessel batches. Secondly, sherds having different motifs or decorative techniques may belong to the same vessel, rather than separate ones; this situation would also alter the number of vessel batches. Agreeing with Krieger that perfection in sorting is impossible, I believe that the number of vessel batches defined for the Whelan site provides a good estimate of the minimum number of vessels disposed and presumably used at the site.

Attributes Recorded

Once separated, the vessel batches are described in terms of attributes based on functional, stylistic and technological criteria. Provenience information is also included. Attributes consist of "individual characteristics that distinguish one artifact from another" (Thomas 1979:456). Attributes are recorded in both nominal and quantitative terms; in some cases, approximations are necessary. Missing data is indicated with a dash. Table 5 provides the attributes under general headings. Appendix I defines the terms used, and Appendix II presents the raw data on vessel batches.

Item 1 in Table 5 is self-explanatory. Item 2 (the sherd catalogue number) is necessary to determine the provenience of each sherd in a vessel batch. Item 3 summarizes the number of sherds within each vessel batch. Sherds with the same catalogue number are tallied as a single sherd.

Analytical provenience represents a culturally relevant provenience based on my reevaluation of the original level notes, floor plans and profiles. Since most of the site was excavated by arbitrary levels, there are few discrete strata, particularly in Mound A. Consequently, the material from one level frequently includes fill from two strata, and cannot be definitely assigned to either. Several provenience categories reflect mixed contexts. Generally, proveniences are kept as discrete as possible when multiple cultural strata are involved

TABLE 5

VESSEL BATCH ATTRIBUTES

1. Vessel Batch Number
2. Catalogue Number(s) of Sherd(s) in Vessel Batch
3. Number of Sherd(s) in Vessel Batch
4. Analytical Provenience:
    a) Mound A cap (Zone III)
    b) Mound A structural zone (Zone II)
    c) Mound A submound (Zone I)
    d) Structure 2
    e) Structure 1
    f) Mound B
    g) Mound A mixed
    h) Mixed Mound A cap/submound (Zones III/I)
    i) Mixed Mound A submound/structural zone (Zones I/II)
    j) Mixed Mound A cap/structural zone (Zones III/II)
    k) Mound A vicinity
    l) Test pits around Mound A
    m) Test pits between Mounds A and B
    n) Mound B vicinity
5. Decorative Technique

a) Undecorated	d) Brushed	g) Miscellaneous wet paste
b) Incised	e) Engraved	
c) Punctated	f) Slipped	

6. Type

   a) Indigenous
   b) Possible indigenous
   c) Presumed trade (includes untypable distinctive specimens)

7. Shape

   a) Bottle
   b) Carinated bowl
   c) Compound bowl
   d) Simple bowl
   e) Cylindrical jar
   f) Everted rimmed jar
   g) Straight rimmed jar
   h) Probable bowl
   i) Probable jar

8A. Temper Material

   a) Grog
   b) Bone
   c) Sand
   d) Organic material
   e) Hematite

8B. Temper Size

   a) Fine
   b) Intermediate
   c) Coarse

9. Rim Orientation

   a) Vertical
   b) Everted
   c) Inverted

10. Rim Shape

   a) Direct
   b) Thinned
   c) Thickened
   d) Rolled out
   e) Angled

11. Lip Form

   a) Round
   b) Flat
   c) Intermediate
   d) Pointed
   e) Other

12. Diameter of Vessel Orifice (in centimeters)

13. Presence/Absence of Soot; Surface of Occurrence

(as in Mound A), but are somewhat looser in units having a single cultural stratum (as in Structure 2).

Attributes 5, 6, 9, 10 and 11 provide information relevant to temporal discrimination, although type is the most sensitive indicator. Decorative technique has both a temporal connotation (Bruseth and Perttulla 1981:70) and a functional association with shape (Anderson et al. 1974:9).

Rim orientation, rim form and lip form are based on shapes set up by Brown (1971:19-20). Of these three attributes, Bruseth and Perttulla (1981:70) stipulate only lip form as being a significant temporal indicator in the Caddoan area.

Attributes 7, 8, 12 and 13 are relevant to form or use. Shape refers to the vessel form determined from sherd morphological characteristics. The shape categories recognized are comparable to those found among the whole vessels from 41UR1, a Whelan Phase cemetery (Thurmond 1981:385). This collection (housed at the Texas Archeological Research Laboratory) is valuable for comparison because it is the only known Whelan Phase site at which an assemblage of whole vessels have been recovered. In general, shape is regarded as the most crucial characteristic for functional interpretations (Anderson et al. 1974; Linton 1944; Lischka 1978; Shafer 1981). Temper, used in the same sense as Shephard (1964:25), consists of the intentional aplastic inclusions in the paste. Sand, hematite and charred organic material in the paste may be intentional additions, but are recorded as possible temper if their frequency and individual grain size surpasses that of the other paste inclusions. Temper size is classified subjectively according to the range of variation in this particular collection. Temper material and size are recognized by Braun (1982a) and Steponaitis (1983) as being crucial for differentiating vessel function.

Diameter of the vessel orifice is measured at the lip rather than at the point of greatest constriction, thereby preventing assessment of a vessel's security of containment and frequency of access (Braun 1980). Measurements at the rim and body juncture (the point of greatest constriction) are not calculated because of the scarcity of sherds with this relationship intact. Diameter is measured on a rim chart having concentric circles one centimeter apart; diameters are rounded to the nearest whole centimeter. If the exact diameter is not determined, a minimum rim diameter is recorded preceded by "≥". This approximation provides a lower limit for the vessel diameter, and gives an estimate of vessel size since diameter and vessel size are correlated (Hally 1983a:167). This attribute is used by Brown (1971), Bruseth and Pertulla (1981) and Anderson et al. (1974) as a prime indicator of vessel size.

The presence of soot is recorded to determine the relative percentage of cooking vessels, since residue is excellent evidence of vessel use (Hally 1983b:7; Linton 1944; Shafer 1981:167). When soot is present, the vessel surface (i.e., interior or exterior) on which it occurs is noted.

Certain attributes utilized by other analysts are not recorded in this study. Thickness, advocated by Braun (1982a, 1982b) and Steponaitis (1983) as a useful characteristic for studying diachronic variation in cooking wares, is not recorded because of its variation on individual sherds. Surface finish, advocated by Brown (1971) as a major technological attribute, is found by Bruseth and Pertulla (1981:73) to be useless because of the differential weathering experienced by sherds in different site contexts. Paste, shown by Braun (1982a) to be technologically important in a vessel's ability to withstand heat and mechanical stress, is not recorded due to my inability to set up clear-cut categories; extremes are recognized, but not intermediate groupings. Instead, I recorded the size of temper particles, which is related to paste characteristics (Gilmore 1973). Other wear patterns, such as the oxidation discoloration and interior pitting described by Hally (1983b: 11-20), are not considered in this analysis because of my dependence on sherds rather than whole vessels. Without complete vessels, determinations of these functionally-related phenomena cannot be made. Moreover, the erosion of the surfaces of most east Texas vessels (Shafer 1981:167) prevents analysis of these attributes. Color is not included as an attribute because of the possible refiring of sherds found in secondary deposits. In addition, partial reconstructions of vessels demonstrated color variations among sherds of the same vessel.

Results of Analysis

Analysis of the vessel batches from Whelan furnishes functional information about the vessels and inferred activities occurring at the site. The functional knowledge to be gained includes: 1) the range of vessel shapes and size classes, and 2) the frequency of cooking vessels. Before proceeding with a discussion, it is important to consider the inherent biases and assumptions underlying my analysis.

The vessel batches are derived from a sample of the Whelan site ceramics; an unavoidable bias is introduced by the act of sorting into these analytical units. Moreover, all attributes are not recorded for each vessel batch, and approximations have been used. Thus, only a portion of the sample is the basis for most of the functional interpretations.

A second bias concerns the distribution of the sample. Excavation and testing of the Whelan site covered a relatively small portion (Fig. 5) of the known site area. Much of the excavation centered on Mound A and Structure 2, from which a majority of the artifacts originated. Any functional data gathered from the vessel batch analysis is restricted to interpretation of these two areas, and cannot be extrapolated to refer to other intrasite activities.

Thirdly, there is no large, closely-related habitation collection with which to compare this assemblage from a ceremonial site. Unfortunately, the only Whelan Phase sites excavated are mound sites; habitation sites are known only by small surface collections. Thus, an important comparative framework is missing.

After recording the 13 attributes for each of the 422 defined vessel batches, I decided not to use computer-run SPSS programs to generate correlations. I opted to perform all calculations manually because of my extensive use of nominal categories, the simplicity and reliability of using frequencies and chi-square tests, and my rather naive understanding of certain computer-generated statistical results. This, to me, represented the most direct method of data manipulation and presentation.

Of the attributes recorded, three carried more functional data than others. The most important one is shape, followed by vessel orifice diameter and the presence of soot. Sherd size (particularly length measurement) is too small to permit accurate determinations of shape on a majority of the vessel batches. Only 109 (26%) of the vessel batches have an identifiable shape which is based solely on the morphological characteristics of the sherd(s) involved. This subset comprises the group from which most of the functional assessments are made. The criterion of vessel orifice diameter provides a valuable complement to shape because of its information about size classes. The third attribute - presence of soot - is regarded as evidence of cooking.

Thus, with these three criteria in mind, specific questions are formulated to guide the analysis: 1) what shapes are represented by the vessel batches? 2) do the shapes correlate with specific decorative techniques? 3) are specific size classes represented within each shape category? 4) are cooking vessels present? and 5) can storage vessels be differentiated from other types of jars?

Table 6 (below) presents a breakdown of the vessel batches by decorative technique, considered by Anderson et al. (1974) and Shafer (1981) as an important covariant of form. Wet paste treatments (a composite group of incised, brushed, punctated and miscellaneous wet paste techniques) dominate, together accounting for 56.7% (N=239) of the vessel batches. Engraved and slipped vessels make up less than one-third (26.7%) of the vessels.

The relationship between decorative technique and the 109 vessel batches of recognizable form is presented in Figure 23. Definable vessel forms include four jar shapes, three bowl shapes and a single bottle form. In addition, undifferentiated bowl and jar categories are set up to account for best-guess approximations of form. Carinated bowls and everted rimmed jars dominate the vessel shapes, each accounting for about one-third of the shape-determined vessel batches. Obvious trends corroborate other findings: jar forms are dominated by the wet paste treatments, while bowl and bottle forms are primarily engraved. Undecorated vessels represent both jar and bowl forms. Note that the two major decorative techniques shown in Table 6, brushing and engraving, also account for a majority of the decoration on the vessel batches of recognizable form (Fig. 23).

Table 6

COUNTS AND FREQUENCIES OF DECORATIVE TECHNIQUES AMONG THE VESSEL BATCHES (N=422)

Undecorated	N= 70 (16.6%)	Miscellaneous wet paste	N= 9 (2.1%)
Brushed	N=134 (31.8%)	Engraved	N=109 (25.8%)
Incised	N= 53 (12.6%)	Slipped	N= 4 (0.9%)
Punctated	N= 43 (10.2%)	TOTAL	N=422 (100.0%)

Ethnohistoric information tells little about the diversity of specific vessel forms among the Caddo in historic times. Swanton (1942: 132, 157-158) mentions large pots to cook beans, to make atole, to keep water, to preserve other edibles and for corn meal offerings. Plates

FIGURE 23

CORRELATION OF DECORATIVE TECHNIQUE WITH SHAPE AMONG VESSEL BATCHES

(N = 109)

U = Undecorated

B = Brushed

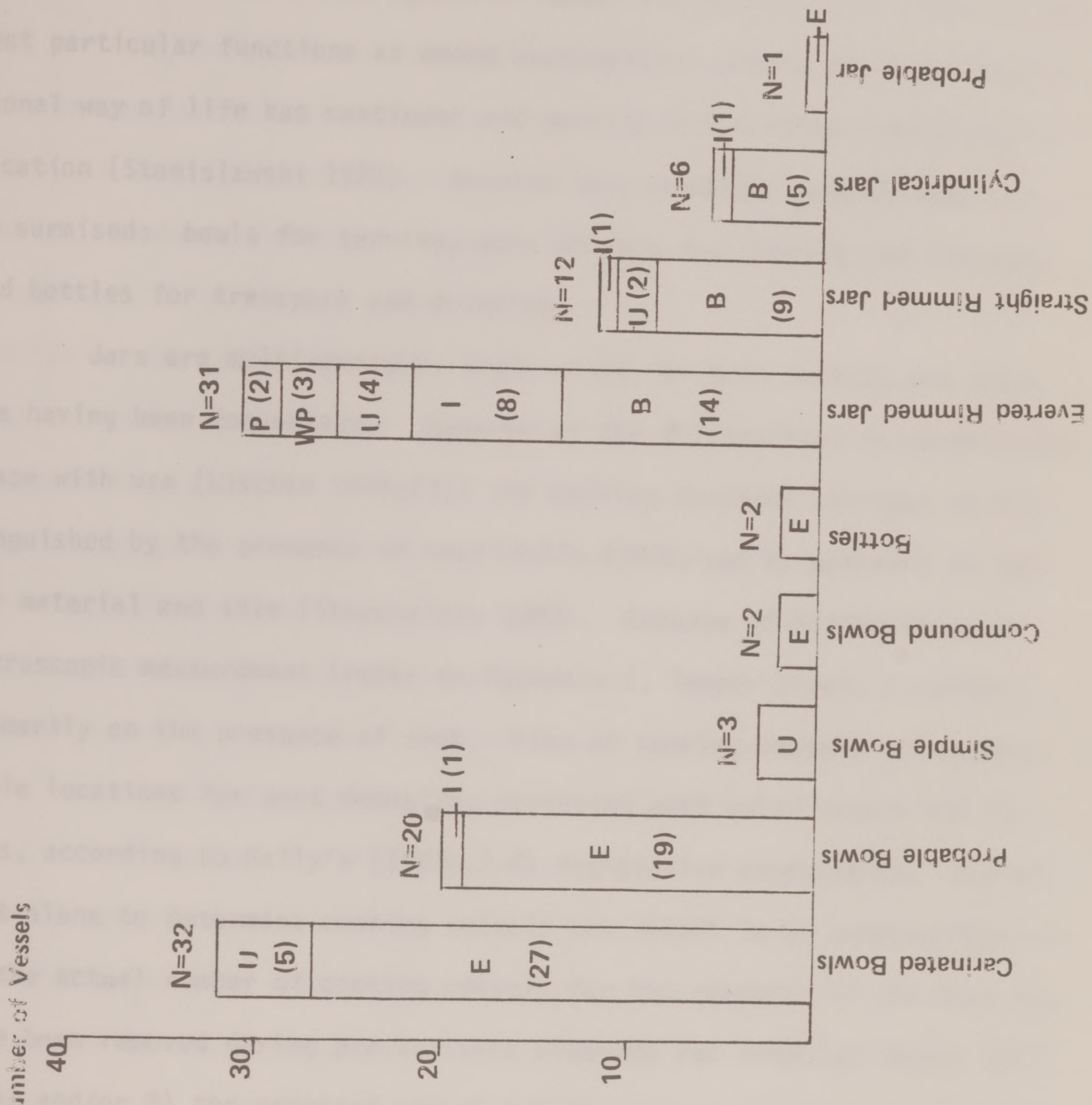
E = Engraved

I = Incised

P = Punctated

WP = Miscellaneous wet paste

Note that no slipped vessels are identified by shape.


Number of Vessels
40
30
20
10
N=32
U (5)
E (27)
Carinated Bowls
N=20
I (1)
E (19)
Probable Bowls
N=3
U
Simple Bowls
N=2
E
Compound Bowls
N=2
E
Bottles
N=31
P (2)
WP (3)
U (4)
I (8)
B (14)
Everted Rimmed Jars
N=12
I(1)
U (2)
B (9)
Straight Rimmed Jars
N=6
I(1)
B (5)
Cylindrical Jars
N=1
E
Probable Jar

and pans are mentioned, presumably for serving; Anderson et al. (1974:7) equate this functional category with the carinated bowl because it most resembles the European plate. Bottles are not even mentioned in Swanton's descriptions. Thus, specific vessel shapes do not as clearly suggest particular functions as among Southwestern groups where the traditional way of life has continued and permits ethnoarchaeological verification (Stanislawski 1978). Despite this problem, general uses can be surmised: bowls for serving, pots or jars for cooking and storage, and bottles for transport and drinking.

Jars are multi-purpose, their usage for both cooking and storage having been documented. Because of the difficulties in correlating shape with use (Lischka 1978:231) the cooking function can best be distinguished by the presence of soot (Hally 1983b) and by patterns in temper material and size (Steponaitis 1983). Because of difficulties in microscopic measurement (refer to Appendix I, Temper Size), I relied primarily on the presence of soot. Rims of cooking vessels are predictable locations for soot deposits, receiving both solid carbon and resins, according to Hally's (1983b:7-8) replicative experiments. Use of soot alone to determine cooking vessels can result in an underestimation of the actual number of cooking vessels for two reasons: 1) the soot may have been removed during pre-analysis cleaning and handling (Brown 1971: 230); and/or 2) the unsooted vessel batches may be unsooted portions of cooking vessels. Moreover, the absence of carbon residue may indicate complete combustion of all carbon byproducts in a hot fire, and thereby eliminate the evidence for the vessel's use in cooking (Lischka 1978: 227).

Table 7 presents the evidence for soot among the 109 vessel batches of identifiable shape. Sixty-eight percent (N=34) of the jars have either no soot or possible evidence of soot. Of the 16 jars that do have soot, seven (14%) have this residue on the interior only, three (6%) on both surfaces, and six (12%) on the exterior alone. This result is consistent with Brown's analysis (1971:230-231) of vessels from Spiro, in which both exterior and interior surfaces contained soot deposits. Bowls at Whelan are represented by lower frequencies of soot; altogether, only six bowls have direct evidence of soot. Forty-seven (82.5%) of the identified bowls lack any evidence of soot, as do both bottles. Clearly the vessel form preferred for cooking is the jar, corresponding with the inferences drawn from ethnohistoric data. The presence of soot residue on bowls (four of which are engraved) is similar to the findings by Brown (1971:230) and Hally (1983a:10) in which both carinated bowls and jars have soot, with jars concluded to be the dominant cooking form. Although the nature of the residue is unknown, it is assumed to have resulted from food preparation (Hally ibid:10).

The problem of differentiating storage or eating vessels from cooking vessels is addressed by Steponaitis (1983), who demonstrated that differences in vessel use are due to temper material and size, as well as paste characteristics. As he anticipated, fine and coarse-tempered wares generally correlated with bowl/bottle and jar forms, respectively. When both wares are subjected to mechanical tests, coarse wares are found to retain their strength under heat and to have lower crack resistance than the finely tempered vessels. Thus, he reasoned, coarse wares are better suited for the stresses of cooking, and fine

TABLE 7

VESSEL BATCHES WITH IDENTIFIABLE SHAPE: CORRELATION OF VESSEL SHAPE WITH PRESENCE OF SOOT

(N = 109)*

	No Soot		? Soot		Soot on Ext		Soot on Int		Soot on Int/Ext		Total	
	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%
Evert rim jar	11	35.5/55.0	10	32.3/71.4	3	9.7/50.0	4	12.9/57.1	3	9.7/100	31	100/62.0
Cylindrical jar	1	16.7/ 5.0	1	16.7/ 7.1	2	33.3/33.3	2	33.3/28.6	0	--/--	6	100/ 12.0
Straight rim jar	8	66.7/40.0	2	16.7/14.3	1	8.3/16.7	1	8.3/14.3	0	--/--	12	100/24.0
Probable jar	0	--/--	1	100/ 7.1	0	--/--	0	--/--	0	--/--	1	100/ 2.0
TOTAL:	20	40.0/100	14	28.0/100	6	12.0/100	7	14.0/100	3	6.0/100	50	100/100
Carinated bowl	25	78.1/53.2	3	9.4/75.0	2	6.3/100	1	3.1/100	1	3.1/33.3	32	100/56.1
Probable bowl	17	85.0/36.2	1	5.0/25.0	0	--/--	0	--/--	2	10.0/66.7	20	100/35.1
Simple bowl	3	100/ 6.4	0	--/--	0	--/--	0	--/--	0	--/--	3	100/ 5.3
Compound bowl	2	100/ 4.3	0	--/--	0	--/--	0	--/--	0	--/--	2	100/ 3.5
TOTAL:	47	82.5/100	4	7.0/100	2	3.5/100	1	1.8/100	3	5.3/100	57	100/100

*Tally excludes two bottles that lack soot.

wares for other functions.

Steponaitis' correlation is tested with the Whelan site vessel batches. Table 8 relates the occurrence of temper size to vessel shape and sooting. Coarse tempering, accounting for 60% (N=30) of the temper size in all jars, dominates regardless of the presence or absence of soot. Interestingly, the jars without soot show twice as great an occurrence of fine temper as in the jars with definite or possible soot. A similar trend is observable in the bowls' tempering, with 63.2% (N=36) of the bowls tempered coarsely, and only 3.5% (N=2) finely. Contrary to Steponaitis' findings, 86.1% (N=36) of the coarse tempering among bowls is found in those lacking soot - in precisely the ones predicted to be fine wares used for eating or serving. Moreover, 10% (N=5) of the jars compared to only 3.5% (N=2) of the bowls are fine tempered, another reversal of Steponaitis' predicted correlation. These two bowls are presumed trade pieces, so the similarity in temper size among the indigenous jars and bowls remains.

Another distinction advanced by Steponaitis concerns whether the presence or absence of soot residue and temper material separates cooking from non-cooking vessels. Table 9 relates the occurrence of vessel shape and sooting to dominant temper. No clear-cut pattern emerges among the jars; both bone and grog tempered vessels account for 34% (N=17) of the shape-determined vessel batches, with bone-and-grog temper used slightly less often at 28%. Jars with soot are as likely to have grog as to have bone tempering, each temper category accounting for 47% (N=7) of the total. However, more jars without soot have bone (43%) than grog (24%). The reverse is true for bowls; among those without

TABLE 8

VESSEL BATCHES WITH IDENTIFIABLE SHAPE: CORRELATION OF SOOTED VESSELS WITH TEMPER SIZE

(N = 109)

	Fine		Fi/Inter		Intermed		Inter/Co		Coarse		Total	
	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%
Jars w/ soot	1	6.2/20.0	0	--/--	5	31.3/41.7	1	6.2/33.3	9	56.3/30.0	16	100/32.0
Jars w/ ? soot	1	7.1/20.0	0	--/--	2	14.3/16.7	1	7.1/33.3	10	71.4/33.3	14	100/28.0
Jars w/o soot	3	15.0/60.0	0	--/--	5	25.0/41.7	1	5.0/33.3	11	55.0/36.7	20	100/40.0
TOTAL:	5	10.0/100	0	--/--	12	24.0/100	3	6.0/100	30	60.0/100	50	100/100
Bowls w/ soot	0	--/--	0	--/--	0	--/--	2	40.0/16.7	4	60.0/11.1	6	100/10.5
Bowls w/ ? soot	0	--/--	0	--/--	1	25.0/20.0	2	50.0/16.7	1	25.0/ 2.8	4	100/ 7.0
Bowls w/o soot	2	4.3/100	2	4.3/100	4	8.5/80.0	8	17.0/66.7	31	66.0/86.1	47	100/82.5
TOTAL:	2	3.5/100	2	3.5/100	5	8.8/100	12	21.1/100	36	63.2/100	57	100/100
Bott w/o soot	0	--/--	1	50.0/100	0	--/--	1	50.0/100	0	--/--	2	100/100

R% = Row percentage; C% = Column percentage.

Fi = Fine; Inter = Intermediate; Co = Coarse.

TABLE 9

VESSEL BATCHES WITH IDENTIFIABLE SHAPE: CORRELATION OF SHAPE WITH DOMINANT TEMPER

(N = 109)

	Grog		Sand*		Bone		Bone and Grog		Total	
	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%
Jars w/ soot	7	46.7/41.2	1	6.7/50.0	7	46.7/41.2	0	--/--	15	100/30.0
Jars w/ ? soot	5	35.7/29.4	1	7.1/50.0	1	7.1/ 5.9	7	50.0/45.4	14	100/28.0
Jars w/o soot	5	23.8/29.4	0	--/--	9	42.9/52.9	7	33.3/54.5	21	100/42.0
TOTAL:	17	34.0/100	2	4.0/100	17	34.0/100	14	28.0/100	50	100/100
Bowls w/ soot	3	50.0/10.3	0	--/--	0	--/--	3	50.0/10.5	6	100/10.5
Bowls w/ ? soot	2	50.0/ 6.9	0	--/--	1	25.0/14.3	1	25.0/ 5.3	4	100/ 7.0
Bowls w/o soot	24	51.1/82.8	1	2.1/100	6	12.8/85.7	16	34.0/84.2	47	100/82.5
TOTAL:	29	50.9/100	1	1.8/100	7	12.3/100	19	33.3/100	57	100/100
Bott w/o soot	1	50.0/100	0	--/--	0	--/--	1	50.0/50.0	2	100/100

*Sand is a possible temper.
R% = Row percentage; C% = Column percentage.

soot, 51.1% (N=24) are tempered with grog compared to 12.8% (N=6) with bone. This preference is more pronounced in the sooted bowls, in which 50% (N=3) have grog and none has bone. Grog is the main temper in all bowls, occurring in 50.9% (N=29) of them; no such dominance is evident in the jars. The two bottles are evenly split between grog and bone-and-grog temper. Sand is poorly represented in all vessel forms. The high frequency of grog in the bowls, considered the eating and serving vessels, may be related to the superior bond afforded by this temper (Shephard 1964:27). In sum, temper categories appear to be more closely related to general vessel form than to specific function.

Differentiation between cooking and storage vessels is a goal of this analysis. Ericson, Read and Burke (1971:89-90) established correlates for predicted physical properties possessed by vessels having a specific function; i.e., cooking, storage, eating. Certain criteria, including relative thickness and surface preparations, are suggested as discriminatory attributes, separating permanent from temporary storage vessels, wet goods from dry goods storage vessels. The criteria proposed by these authors are not included within the attribute list for this study for reasons previously cited. Without any explicit criteria for differentiating between cooking and storage vessels, I can use only the presence of soot to indicate a vessel's probable use for cooking. However, Table 7 suggests that the straight rimmed jar may be a preferred form for storage since 66.7% (N=8) of the recognized sample are lacking soot.

A second analytic focus is on vessel diameters to determine vessel size and thereby infer individual household or communal use. Minimum diameter is used in cases where that measurement is approximated. Diameters are indeterminate when the lip is missing; this is particularly evident (Fig. 24) among carinated bowls, in which the rolled out or angled lips are easily broken off.

Figure 24 presents the correlation of vessel shapes by diameter. Among everted rimmed and cylindrical jars and carinated bowls a bimodal distribution of size is apparent. Greater reliance is placed on the sizes of the everted rim jars than the other vessel forms because of the former's higher number of measurable diameters. Cylindrical jars exhibit only a weak bimodality because of the small sample size. The apparent bimodality of diameter size among the carinated bowls is offset by the unimodal distribution evident among the probable bowls, many of which are probably carinated bowls. As previously mentioned, few carinated bowl diameters can be measured, so the sample results may not be representative. The diameters of the straight rimmed jars appear to be evenly distributed within the 14 to 26 centimeter range. Because the sample sizes for the simple bowls (N=3), compound bowls, (N=2), and the probable jar (N=1) are too small for significant results, these vessel classes are not presented in Figure 23. By definition for vessel batch inclusion, bottle bodies yielded no diameter data.

The two sizes represented by the everted rim jars consist of vessels less than 21 centimeters in diameter and those between 30 and 44 centimeters. The size distribution of carinated bowls in similar: one group is less than 18 centimeters in diameter, while the larger vessels are 24 centimeters or larger in diameter. In assessing the size of Caddoan mortuary vessels from the Attaway site, Shafer (1981:170)

FIGURE 24

VESSEL BATCHES WITH IDENTIFIABLE SHAPE:
CORRELATION OF VESSEL SHAPES WITH DIAMETERS

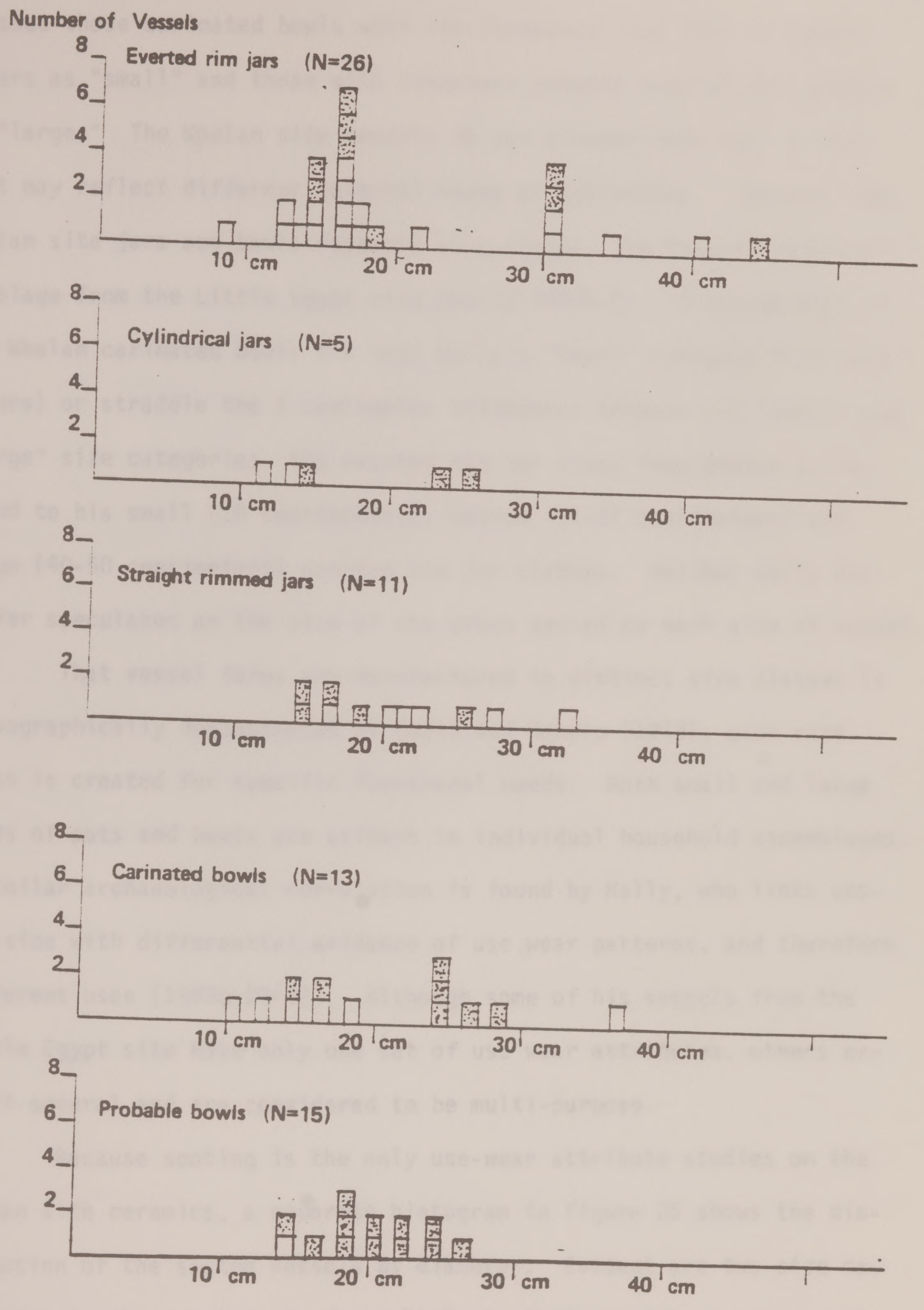
(N = 70)*

Solid bars = definite diameters.

Stippled bars = approximate minimum diameters.

No graphs are included for probable jars, simple and compound bowls because of small sample size. Bottles are excluded because their orifice diameters are not measurable.

*39 vessels have indeterminate diameters.


Number of Vessels
Everted rim jars (N=26)
8
6
4
2
10 cm
20 cm
30 cm
40 cm
Cylindrical jars (N=5)
8
6
4
2
10 cm
20 cm
30 cm
40 cm
Straight rimmed jars (N=11)
8
6
4
2
10 cm
20 cm
30 cm
40 cm
Carinated bowls (N=13)
8
6
4
2
10 cm
20 cm
30 cm
40 cm
Probable bowls (N=15)
8
6
4
2
10 cm
20 cm
30 cm
40 cm

classed those carinated bowls with rim diameters less than 15 centimeters as "small" and those with diameters greater than 35 centimeters as "large." The Whelan site vessels do not cluster this way, a fact that may reflect different cultural norms or activities. Instead, the Whelan site jars and bowls resemble more closely the Mississippian assemblage from the Little Egypt site (Hally 1983b:5). Although most of the Whelan carinated bowls fit into Hally's "small" category (<25 centimeters) or straddle the 3 centimeter difference between his "small" and "large" size categories, the everted rim jar sizes from Whelan correspond to his small (18 centimeters), medium (21-37 centimeters) and large (40-50 centimeters) pinched rim jar classes. Neither Hally nor Shafer speculates on the size of the group served by each size of vessel.

That vessel forms are manufactured in distinct size classes is ethnographically demonstrated by David and Hennig (1972); each size class is created for specific functional needs. Both small and large sizes of pots and bowls are evident in individual household assemblages. A similar archaeological correlation is found by Hally, who links vessel size with differential evidence of use wear patterns, and therefore different uses (1983b:20-23). Although some of his vessels from the Little Egypt site have only one set of use wear attributes, others exhibit several and are considered to be multi-purpose.

Because sooting is the only use-wear attribute studies on the Whelan site ceramics, a separate histogram in Figure 25 shows the distribution of the sooted vessels by diameter. Evident are two size categories in the everted rim jars which may indicate two separate cooking sizes among this jar form. There is greater support for the smaller

FIGURE 25

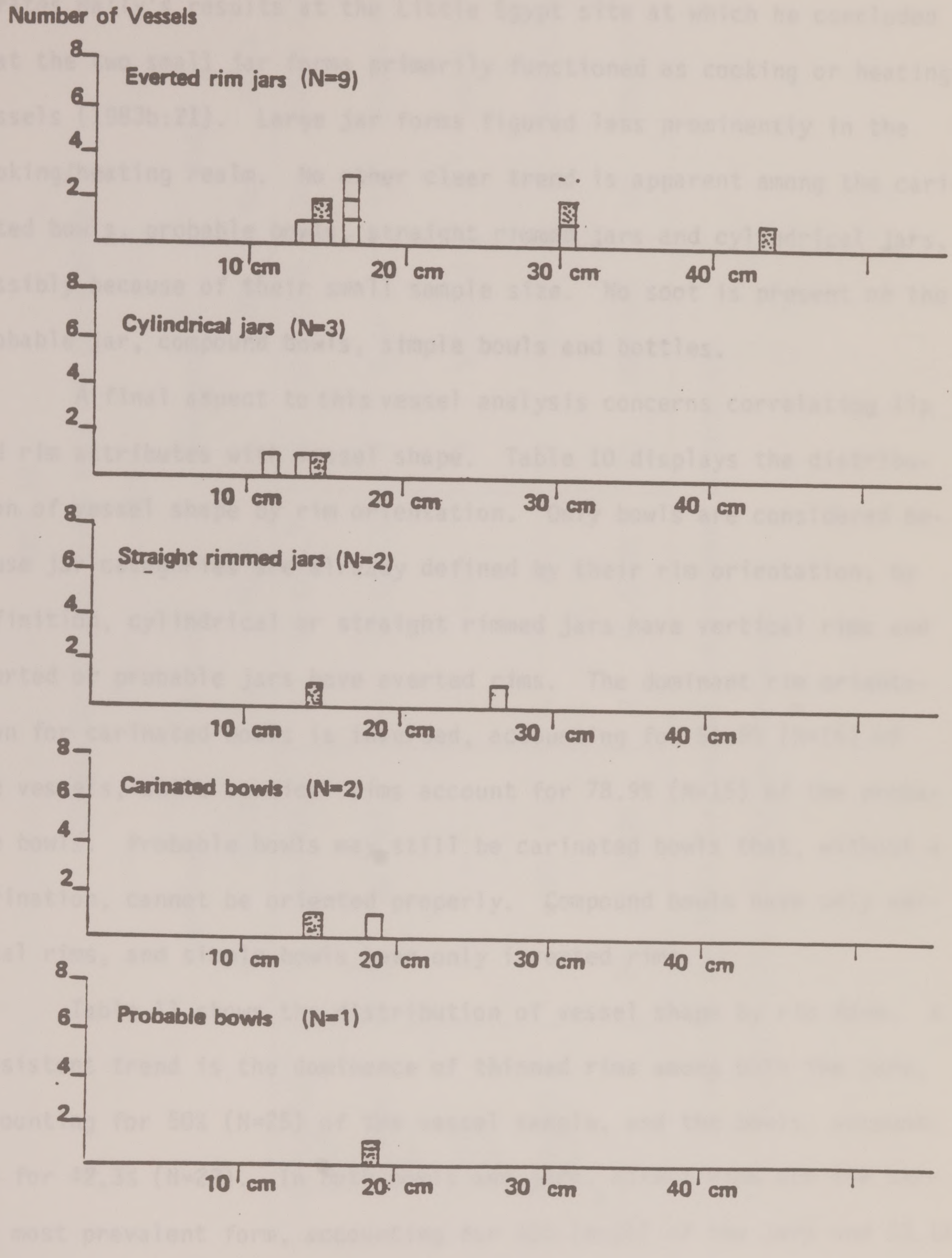
VESSEL BATCHES WITH IDENTIFIABLE SHAPE:
CORRELATION OF SOOTED VESSELS WITH DIAMETERS

(N = 17)*

Solid bars = definite diameter.

Stippled bars = approximate minimum diameter.

*92 vessels with identifiable shape show no indication of soot.



Number of Vessels
Everted rim jars (N=9)
Cylindrical jars (N=3)
Straight rimmed jars (N=2)
Carinated bowls (N=2)
Probable bowls (N=1)
8
6
4
2
10 cm
20 cm
30 cm
40 cm

vessels with diameters less than 20 centimeters. This finding corroborates Hally's results at the Little Egypt site at which he concluded that the two small jar forms primarily functioned as cooking or heating vessels (1983b:21). Large jar forms figured less prominently in the cooking/heating realm. No other clear trend is apparent among the carinated bowls, probable bowls, straight rimmed jars and cylindrical jars, possibly because of their small sample size. No soot is present on the probable jar, compound bowls, simple bowls and bottles.

A final aspect to this vessel analysis concerns correlating lip and rim attributes with vessel shape. Table 10 displays the distribution of vessel shape by rim orientation. Only bowls are considered because jar categories are already defined by their rim orientation; by definition, cylindrical or straight rimmed jars have vertical rims and everted or probable jars have everted rims. The dominant rim orientation for carinated bowls is inverted, accounting for 51.6% (N=16) of the vessels, while vertical rims account for 78.9% (N=15) of the probable bowls. Probable bowls may still be carinated bowls that, without a carination, cannot be oriented properly. Compound bowls have only vertical rims, and simple bowls have only inverted rims.

Table 11 shows the distribution of vessel shape by rim form. A consistent trend is the dominance of thinned rims among both the jars, accounting for 50% (N=25) of the vessel sample, and the bowls, accounting for 42.3% (N=22). In both bowls and jars, direct rims are the second most prevalent form, accounting for 30% (N=25) of the jars and 23.1% (N=12) of the bowls. The three other rim forms are present among both vessel shapes, but a higher percentage of angled and rolled out rims are

TABLE 10

CORRELATION OF BOWL SHAPE WITH RIM ORIENTATION

(N = 57)*

	Vertical		Everted		Inverted		Total	
	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%
Carinated bowl	9	29.0/34.6	6	19.4/66.7	16	51.6/80.0	31	100/56.4
Probable bowl	15	78.9/57.7	3	15.8/33.3	1	5.3/ 5.0	19	100/34.5
Simple bowl	0	--/--	0	--/--	3	100/15.0	3	100/ 5.5
Compound bowl	2	100/ 7.7	0	--/--	0	--/--	2	100/ 3.6
TOTAL:	26	47.3/100	9	16.4/100	20	36.4/100	55*	100/100

*Tally excludes two bowls that are of indeterminate orientation.

R% = Row Percentage; C% = Column Percentage.

TABLE 11

VESSEL BATCHES WITH IDENTIFIABLE SHAPE: CORRELATION OF VESSEL SHAPE WITH RIM FORM

(N = 109)*

	Direct		Thinned		Thickened		Rolled Out		Angled		Total	
	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%
Evert rim jar	9	29.0/60.0	15	48.4/60.0	2	6.5/66.7	4	12.9/80.0	1	3.2/50.0	31	100/62.0
Cylindrical jar	1	20.0/ 6.7	4	80.0/16.0	0	--/--	0	--/--	0	--/--	5	100/10.0
Straight jar	4	30.8/26.7	6	46.2/24.0	1	7.7/33.3	1	7.7/20.0	1	7.7/50.0	13	100/26.0
Probable jar	1	100/ 6.7	0	--/--	0	--/--	0	--/--	0	--/--	1	100/ 2.0
TOTAL:	15	30.0/100	25	50.0/100	3	6.0/100	5	10.0/100	2	4.0/100	50	100/100
Carinated bowl	3	10.7/25.0	11	39.3/50.0	2	7.1/66.7	5	17.9/62.5	7	25.0/100	28	100/53.8
Probable bowl	6	33.3/50.0	10	55.6/45.5	1	5.6/33.3	1	5.6/12.5	0	--/--	18	100/34.6
Simple bowl	3	75.0/25.0	0	--/--	0	--/--	1	25.0/12.5	0	--/--	4	100/ 7.6
Compound bowl	0	--/--	1	50.0/ 4.5	0	--/--	1	50.0/12.5	0	--/--	2	100/ 3.8
TOTAL:	12	23.1/100	22	42.3/100	3	5.8/100	8	15.4/100	7	13.5/100	52**	100/100

*Tally excludes two bottles that lack rim forms.

**Five bowls have an unknown orientation and are eliminated from this table.

evident on bowls than on jars. Carinated bowls and everted rim jars both exhibit the greatest diversity in rim forms, possible because of their dominance in the sample of recognized forms. Least popular as a rim treatment is thickening.

Closely associated with rim form is lip form. Round lips Table 12) dominate both bowl and jar forms: 52.1% (N=25) of the jars and 74.4% (N=29) of the bowls have rounded lips. A more interesting pattern occurs in the distribution of flat lips, the next most common lip form. One-third of the jars (N=16), and only 17.9% (N=7) of the bowls have flat lips, thereby indicating a possible trait correlating with shape. A possible functional explanation for this difference concerns the facilitation afforded by flattened lips for lidding a jar during cooking or storage. Noteworthy is the omission of 50% (N-16) of the total number of defined carinated bowls because of missing lip data. No pointed lips and few other lip forms are recognized among the Whelan site vessel batches.

Discussion of Vessel Batch Analysis

From the 422 recognized vessel batches in the Whelan site ceramic collection, 109 vessels are defined by shape. Among this latter group, there are slightly more bowls (N=57, 52.3%) than jars (N=50, 45.9%). However, because of the strong correlation between decorative technique and shape (Fig. 22), the predominance of wet paste vessels (N= 239, 56.6%) compared to engraved and slipped (N=113, 26.8%) in the total vessel batches suggests that jars - whether for cooking, storage or transport - outnumbered bowls. Bottles are rare, numbering only 2(1.8%)

TABLE 12

VESSEL BATCHES WITH IDENTIFIABLE SHAPE: CORRELATION OF VESSEL SHAPE WITH LIP FORM

(N = 109)*

	Round		Flat		Intermed		Pointed		Other		Total	
	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%
Evert rim jar	17	58.6/68.0	7	24.1/43.8	3	10.3/60.0	0	--/--	2	6.9/100	29	100/60.4
Cylindrical jar	1	16.7/ 4.0	4	66.7/25.0	1	16.7/20.0	0	--/--	0	--/--	6	100/12.5
Straight jar	7	58.3/28.0	4	33.3/25.0	1	8.3/20.0	0	--/--	0	--/--	12	100/25.0
Probable jar	0	--/--	1	100/ 6.3	0	--/--	0	--/--	0	--/--	1	100/ 2.1
TOTAL:	25	52.1/100	16	33.3/100	5	10.4/100	0	--/--	2	4.2/100	48*	100/100
Carinated bowl	12	75.0/41.4	3	18.8/42.9	1	6.3/50.0	0	--/--	0	--/--	16	100/41.0
Probable bowl	14	77.8/48.3	3	16.7/42.9	1	5.6/50.0	0	--/--	0	--/--	18	100/46.2
Simple bowl	2	66.7/ 6.9	0	--/--	0	--/--	0	--/--	1	33.3/100	3	100/ 7.7
Compound bowl	1	50.0/ 3.4	1	50.0/14.3	0	--/--	0	--/--	0	--/--	2	100/ 5.2
TOTAL:	29	74.4/100	7	17.9/100	2	5.1/100	0	--/--	1	2.6/100	39*	100/100

*Tally excludes two bottles, two jars and eighteen bowls.
R% = Row percentage; C% = Column percentage.

of the vessel batches. The higher number of jars suggests a possible prevalence of cooking or storage activities that could reflect either domestic activities or those related to ceremonial feasting (Swanton 1942).

Cooking, recognized on vessels by the presence of soot, is the one defined activity. Storage activities, described by the ethnohistoric literature, are tentatively inferred from those jars without soot. As the data in Table 7 demonstrates, more jars are found to lack soot (N=20, 40%) than to have it (N=16, 32%). Both cooking and storage activities, then, are hypothesized from the Whelan vessel batches.

Specific functions cannot be securely tied in with specific jar forms, although the data in Table 7 shows that 55% (N=11) and 40% (N=8) of the non-sooted jars are everted rimmed and straight rimmed jars, respectively. Cylindrical jars may be the preferred cooking form, since 66% (N=4) of them are sooted. No definite conclusions are feasible because of the small sample represented by these 109 vessel batches with identifiable shape.

Although uses cannot be clearly ascertained, jar sizes among two forms are well-defined. The vessel diameters of the straight rimmed jars indicate a unimodal distribution, whereas a bimodal clustering is apparent among the everted rimmed jars.

Inferences about activities from the bowl forms are less explicit. Three bowl shapes are defined, yet specific uses related to each form are unknown. Although the ethnohistoric literature suggests their role as eating or serving vessels, the presence of soot on four carinated bowls may indicate their use as cooking vessels or perhaps as containers for ritual offerings. There is weak evidence for a bimodal size distribution for carinated bowl diameters (Fig. 23), which may hint at functional differences. Clearly, the non-dominance of bowls within the Whelan site vessel batches (based on the decorative technique tallies rather than shape) represents an important clue about the nature of activities occurring at the site.

Summary

Wet paste treatments dominate the sherd collection, with undecorated sherds the next most prominent decorative category. A typological analysis, which has identified the indigenous, possible indigenous and presumed trade types at Whelan, is crucial for placing the site as a Late Whelan Phase occupation.

Vessel batches are sorted from the sherd collection to provide an estimate of the minimum number of vessels, and are the basis for a functional analysis. Important functional attributes recorded included shape, the presence of soot, and vessel diameter. Analysis of the vessel batches indicates the dominance of jar forms, the presence of several size groups, and specific shapes among the bowls and jars. The abundance of jars suggests a range of activities that consisted largely of cooking and storage.

Chapter 7

INTRASITE DISTRIBUTION

Intrasite artifact distributions are widely used to establish chronology, to identify activity areas within a site as well as to establish overall site function(s). Artifacts associated with cultural features have been used to study, for example, room functions (Hill 1970), intrasite activity loci (Lischka 1978; Rogers 1982) and domestic household assemblages (Hally 1983b). The vertical distribution of the ceramics from Mound A at Whelan are examined to look for temporal changes in the strata, while the horizontal distributions are used to infer activities represented by the disposal of ceramics in specific locations.

Prior to an examination of the vertical and spatial patterning of the Whelan material, the integrity of the site (Schiffer 1972, 1983) and the disturbance factors (Wood and Johnson 1978) are evaluated. Culturally relevant proveniences are then defined and selected intrasite distributions are analyzed. The raw data for this analysis consists of a sample of sherds from Mound A and the vessel batches from Mounds A and B and Structures 1 and 2. The distributions of the vessel batches are then compared by means of chi-square tests, which are used to measure the significance of the distributions, and the Pearson's contingency coefficient, which is used to assess the strength of significant relationships. The recorded vessel batch attributes are described in Appendix II and in tabulations which are not included here, but which are on file at the Texas Archeological Research Laboratory. Appendix III furnishes the statistical formulae for the chi-square tests and the Pearson's contingency coefficient.

Site Integrity

Before excavation, the Whelan site was relatively undisturbed, for, unlike many east Texas sites, it had not been plowed or machine-cleared. Vandalism was minor, as only a few potholes were noted in the mounds.

The effect natural processes have had on the integrity of the site are difficult to assess. The floodplain location of Whelan made it potentially vulnerable to the effects of periodic flooding. While there was no evidence for much deposition since aboriginal occupation of the site, small gullies at the edge of the level area (Fig. 5) indicate that some erosion has occurred at an uncertain time(s) in the past. The effects of these processes cannot be adequately measured, yet both must be kept in mind as possibly having disturbed artifact distributions, especially the spatial ones.

Another natural factor of concern is bioturbation; that is, the disturbance of archaeological strata, features and vertical artifact distributions by animals and plants. Sandy soils, well represented at Whelan, are the preferred habitat for the plains pocket gopher, whose burrowing activities can displace artifacts as well as mix and obliterate soil zones. The growth and decay of tree roots can also disturb archaeological contexts.

These problems are common to many east Texas sites, and must surely have resulted in some distortion and destruction of the archaeological record in the area. Despite the unknown effect of the natural factors, the artifact distributions at Whelan are judged to be much as they were when the site was abandoned by its aboriginal occupants.

Cultural Contexts

The horizontal and vertical control systems employed in the excavation of the Whelan site (see discussion in Chapter 4) make it difficult to assign the ceramic collection to discrete cultural contexts. Particularly troublesome are the artitrary levels used to investigate Mound A, and the failure to keep the artifacts found in feature fill separate from those recovered from the surrounding matrix.

To extract the most meaningful ceramic associations possible, I have constructed an analytical provenience system that regroups the arbitrarily defined proveniences into culturally relevant ones. The original Whelan site square notes, plans and profiles provide the basic data used to devise this system. Davis' analysis of the stratigraphic sequence for each square (lab notes for tabulation) was also consulted. However, my provenience system significantly differs from the one used by Davis in that I have distinguished between discrete and mixed strata, while Davis assumed that nearly all levels constituted discrete analytical units.

In developing a more culturally meaningful provenience system, I have been concerned primarily with Mounds A and B and Structures 1 and 2, where most of the excavations occurred. Provenience units are kept as discrete as possible. Mound A, for example, consists of three cultural strata (Fig. 6), but to separate the mixed and unmixed cultural strata, I had to recognize seven different vertical provenience units. Structure 1, on the other hand, is treated as a single provenience because there was no definable stratigraphy to which ceramics could be assigned. The natural stratigraphy recognized at the site by Davis is ignored for two reasons: 1) these appear to be soil horizons that formed in situ rather than depositional units, and 2) the arbitrary excavation levels cannot be related to these soil horizons. A complete list of my provenience units is given in Appendix I.

Although there are obvious limitations, this provenience system is amenable to answering questions concerning intrasite activities and chronology. These questions are addressed using the sherds from stratified contexts in Mound A and the vessel batches from Mound A and B as well as from Structures 1 and 2.

Temporal Study of Ceramics from Mound A

Methods

The assumption that the Whelan ceramic collection represents a temporally homogeneous group must be tested. The best evidence to verify or refute this assumption comes from Mound A, where three strata are defined (Fig. 6). Of these strata, Zone 1 (the premound ground surface and underlying soil horizon) and Zone II (the stratified sand, silts, clay bands and ash associated with the use and/or destruction of Structures 3A, B and C) are the most useful for temporal study. Zone I represents the original ground surface upon which Zone II accumulated. Zone III, representing the final event in the construction of Mound A, could not be utilized for temporal control because it consisted of secondary fill that does not necessarily postdate the underlying strata.

While Zones I and II constitute a well-defined stratigraphic sequence, it is possible that sherds recovered from them could have complex histories of use and disposal (see Schiffer 1972 for a discussion). The assumptions I am making in this analysis, therefore, must be made explicit. Most importantly, I am assuming that 1) the sherds from Zone I relate to activities which took place nearby, and 2) those in Zone II relate to activities during the use and/or destruction of Structures 3A-C. If correct, then an analysis of the ceramics from both zones could reveal short-term temporal change similar to those identified in the study of the Cedar Grove ceramics (Schambach and Miller 1983). Davis recognized this possibility in asserting that Zone I may represent "the early part of the main occupation of the site" (1958:25-26).

Two factors, the arbitrary provenience units used in the field and the assigning of an individual catalogue number to each sherd, made it difficult to retrieve from the collection the specimens from Zones I and II. To be on the safe side, I used only the sherds from the squares where Zones I and II could be differentiated with confidence. The separate lists of individual sherd numbers I had made for each relevant excavation level were combined to create a master catalogue which related the specimens from these units to Zones I and II. The actual retrieval of the sherds required sorting through the entire collection. Expecting to find 1394 sherds, I was able to recover only 827, a 60% sample. The only explanations I can offer for the unexpected low number are 1) some sherds simply were overlooked, 2) some fragments were included with the 435 sherds that were excluded from my analysis, and

3) some sherds were lost during the 20-year interval that separates the laboratory cataloguing and my analysis.

Once the sherds from Zones I and II were assembled, each was examined for many of the attributes used in the analysis presented in Chapter 6. Since temper, decorative technique and, when identifiable, type are the most useful indications of temporal changes in Caddoan ceramics, the discussion which follows emphasizes these aspects of the collection. Moreover, because of small sample sizes, several decorative technique categories have been combined to create statistically more useful numbers. Specifically, slipped sherds are grouped with engraved sherds, and incised, punctated and miscellaneous wet paste treatments are collapsed into a single (other wet paste) group.

Results

Tables 13-15 indicate the distribution of decorative techniques, types and temper categories among the sherds recovered from the two Mound A strata. That Zone I accounts for 81.3% (N=672) of the total sample may introduce a significant bias into my efforts to examine the intrasite chronology. Tentatively, then, differences in the relative frequencies among decorative techniques and, to a lesser extent, temper appear meaningful. Wet paste treatments are more common in Zone I than in Zone II, while the reverse distribution holds true for the engraved/slipped sherds (Table 13). The temper categories are evenly distributed except bone, which is slightly more frequent in Zone II than in Zone I (Table 15). Relatively few of the Mound A sherds (6.6%) can be typed because of their small size. The three types recognized (either

TABLE 13

DISTRIBUTION OF DECORATIVE TECHNIQUES FROM MOUND A STRATA

(N = 827)

	Zone I		Zone II		Total	
	No.	R%/C%	No.	R%/C%	No.	R%/C%
Undecorated	280	82.8/41.7	58	17.2/37.4	338	100/40.9
Brushed	224	80.0/33.3	56	20.0/36.1	280	100/33.9
Other Wet Paste	122	87.1/18.2	18	12.9/11.6	140	100/16.9
Engraved/ Slipped	46	66.7/ 6.8	23	33.3/14.8	69	100/ 8.3
TOTAL:	672	81.3/100	155	18.7/100	827	100/100

R% = Row Percentage; C% = Column Percentage.

Other Wet Paste consists of all incised, punctated and miscellaneous wet paste treatments.

TABLE 14

DISTRIBUTION OF TYPES FROM MOUND A STRATA

(N = 827)

	Zone I		Zone II		Total	
	No.	R%/C%	No.	R%/C%	No.	R%/C%
Ripley Eng.	4	66.7/ .6	2	33.3/ 1.3	6	100/ .7
Maydelle Incised	14	87.5/ 2.1	2	12.5/ 1.3	16	100/ 1.9
Pease Brushed Incised	20	83.3/ 3.0	4	16.7/ 2.6	24	100/ 2.9
Unknown	634	81.2/94.3	147	18.8/94.8	781	100/94.4
TOTAL	672	81.3/100	155	18.7/100	827	100/100

R% = Row Percentage; C% = Column Percentage.

TABLE 15

DISTRIBUTION OF TEMPER FROM MOUND A STRATA

(N = 827)

	Zone I		Zone II		Total	
	No.	R%/C%	No.	R%/C%	No.	R%/C%
Grog	276	81.9/41.1	61	18.1/39.4	337	100/40.7
Bone	184	78.0/27.4	52	22.0/33.5	236	100/28.5
Bone and Grog	135	81.3/20.1	31	18.7/20.0	166	100/20.1
Sand	50	83.3/ 7.4	10	16.7/ 6.5	60	100/ 7.3
Other*	27	96.4/ 4.0	1	3.6/ .6	28	100/ 3.3
TOTAL	672	81.3/100	155	18.7/100	827	100/100

R% = Row Percentage; C% = Column Percentage.

*This category consists of sherds with no apparent temper, other possible temper and those sherds for which no data was recorded.

indigenous or possible indigenous) occur in about the same relative frequency in each zone (Table 14).

Chi-square tests were run to help discriminate between real differences in the samples and sampling error. If a significant relationship were indicated by the chi-square value, the strength of this relationship was measured via the Pearson's contingency coefficient (c). Small cell sizes in chi-square table were adjusted by use of the Yates' correction for continuity. All statistical formulae are provided in Appendix III. All chi-square tables show the observed frequencies, the degrees of freedom, the chi-square statistic, a significance statement, and, when applicable, the value of the Pearson's contingency coefficient.

Tables 16 through 18 present the results of chi-square analyses, comparing the distributions of the temporal attributes of type, decorative technique and temper. At the .05 level of confidence, only the distribution of decorative technique is significant; however, the low value of Pearson's contingency coefficient indicates that this relationship is weak.

Since the difference between Zones I and II could be attributed to either temporal or functional changes, additional tests were carried out. First, the distributions of brushed and non-brushed sherds were compared, because over much of northeast Texas, brushing increases in frequency through time (Newell and Krieger 1949:191-192; Stokes and Woodring 1981:189-190). The results (Table 19) indicate that the distributions are statistically independent and thereby provide no support for a temporal interpretation.

TABLE 16

CHI-SQUARE TEST COMPARING DISTRIBUTIONS OF DECORATIVE TECHNIQUES FROM MOUND A STRATA

	Zone I	Zone II	Total
Undecorated	280	58	338
Brushed	224	56	280
Other Wet Paste	122	18	140
Engraved/Slipped	46	23	69
Total	672	155	827

$X^2 = 13.68$; df = 3; significant at .05; c = .14

TABLE 17

CHI-SQUARE TEST COMPARING DISTRIBUTIONS OF TYPES FROM MOUND A STRATA

	Zone I	Zone II	Total
Ripley Engraved	4	2	6
Maydelle Incised	14	2	16
Pease Brushed-Inc.	20	4	24
Total	38	8	46

$X^2 = 2.56$; df = 2; not significant at .05; Yates' correction for continuity used

TABLE 18

CHI-SQUARE TEST COMPARING DISTRIBUTIONS OF TEMPER FROM MOUND A STRATA

	Zone I	Zone II	Total
Grog	276	61	337
Bone	184	52	236
Grog and Bone	135	31	166
Sand	50	10	60
Other	27	1	28
Total	672	155	827

$X^2 = 6.16$; df = 4; not significant at .05

Next a chi-square analysis was performed to determine the strength of the differences on the wet paste decorated and engraved/ slipped sherds (Table 20), since these decorative categories are thought to relate to vessel use. The results, which are significant at .001 level of confidence and are supported by a moderate value for the contingency coefficient, suggest that the differences between Zone I and II may be due to functional rather than temporal variations. To test further for this possibility, the sherds are classified by vessel shape (Table 21) because of the strong association between surface treatment and shape noted at Whelan (Fig. 22) and other Caddoan sites (Kleinschmidt 1982:191; Anderson et al. 1974:9). The chi-square results (Table 22) yield insignificant results and support the implicit null hypothesis that there is no difference between the vessel forms found in the two zones.

On the basis of the attributes examined, there is no evidence for a well-defined temporal change between the ceramics from Zones I and II. Since the strongest chi-square and contingency coefficient results came from a comparison of the distributions of wet paste and engraved/slipped decorations, functional changes may be indicated. However, without confirmation from the distribution of jars and bowls, this interpretation is highly tenuous. It is weakened even further when several other factors are considered. First, the generally small sample sizes (especially in Zone II) present the possibility that even limited disturbance by bioturbation and by the repeated use of the Mound A area could significantly skew the results. Important in this regard is the finding of four sherds from Zone I that fitted onto sherds from Zone II.

TABLE 19

CHI-SQUARE TEST COMPARING DISTRIBUTIONS OF SHERDS WITH BRUSHED AND NON-BRUSHED TREATMENTS FROM MOUND A STRATA

	Zone I	Zone II	Total
Brushed	224	56	280
Non-Brushed	448	99	547
Total	672	155	827

X^2 = .39; df = 1; not significant at .05

TABLE 20

CHI-SQUARE TEST COMPARING DISTRIBUTIONS OF SHERDS WITH WET PASTE AND ENGRAVED/SLIPPED TREATMENTS FROM MOUND A STRATA

	Zone I	Zone II	Total
Wet Paste	122	18	140
Engraved/Slipped	46	23	69
Total	168	41	209

X^2 = 12.27; df = 1; significant at .001; c = .24

TABLE 22

CHI-SQUARE TEST COMPARING DISTRIBUTIONS OF BOWLS AND JARS FROM MOUND A STRATA

	Zone I	Zone II	Total
Jars	74	20	94
Bowls	31	17	48
Total	105	37	142

X^2 = 3.29; df = 1; not significant at .05

TABLE 21

DISTRIBUTION OF VESSEL SHAPES FROM MOUND A STRATA

(N = 827)

	Zone I		Zone II		Total	
	No.	R%/C%	No.	R%/C%	No.	R%/C%
Bottle	24	80.0/ 3.6	6	20.0/ 3.9	30	100/ 3.6
Jar	74	78.7/11.0	20	21.3/12.9	94	100/11.4
Carinated bowl	25	73.5/ 3.7	9	26.5/ 5.8	34	100/ 4.1
Other bowl	6	42.9/ 1.0	8	57.1/ 5.2	14	100/ 1.7
Unknown	543	82.9/80.8	112	17.1/72.3	655	100/79.2
TOTAL	672	81.3/100	155	18.7/100	827	100/100

R% = Row Percentage; C% = Column Percentage

(For obvious reasons, these sherds have been excluded from tallies given in Tables 13-21.) Second, most of the sherd categories used in this analysis are comprised of specimens that could have had different temporal or functional histories (e.g., slipped and engraved; or incised, punctated and miscellaneous wet paste decoration). Though necessary to obtain large sample sizes, these composite groupings may have had a serious dampening effect on the results. Lastly, it should be recalled that some, if not all, of the sherds from Zone II could have been introduced with the stratified fill that comprises this portion of Mound A. If so, these sherds would not necessarily postdate those found in Zone I.

In sum, the differences observed between the distribution of sherds in Zone I and in Zone II do not form consistent, easily interpreted patterns. When viewed in light of the caveats discussed above, it is even doubtful that they are significant. Thus, on the basis of solid evidence to the contrary, it is assumed that there were no significant changes through time in the vessels used and/or discarded at the Whelan site. This assumption underlies the vessel batch analysis that follows.

Vessel Batch Distribution

Methods

The analytical provenience system remains the basis for this portion of the study, but certain provenience categories are combined to derive more meaningful comparisons. Since the major focus of investigation was the two mounds and two structures, these constitute the main areas in which to examine ceramic functional differences. In most of the following tables, the vessel batches from Zones I, II, and III as well as those from mixed or uncertain locations within Mound A are combined into a single Mound A provenience tally. A similar lumping strategy is used for the three other major proveniences. Other relevant provenience categories are the area around Mound A and that around Mound B; the behavioral significance of these areas stems from their probable use as sources of mound fill. Where dual proveniences are recorded, separate pieces of a single vessel batch were found in different locations; these locations are specified when one of the mounds or structures is involved.

Table 23

NUMBER OF SHERDS PER VESSEL BATCH
(N=422)

No. of Sherds	No. of Vessel Batches	%
1	287	68.0
2	64	15.2
3	28	6.6
4	20	4.7
5-6	15	3.6
7-8	5	1.2
10 or more	3	.7
TOTAL	422	100.0

Results

The vessel batch analysis begins with an examination of the number of sherds that comprise each vessel batch (Table 23). Sixty-eight percent (N=287) of the vessel batches consist of single sherds, and .7% (N=3) are represented by 10 or more sherds. The multiple-sherd vessel batches have potential for yielding information about refuse patterns, which are briefly discussed at the end of this chapter.

The distributional data for the 287 single-sherd vessel batches is presented in Table 24. Mound A accounts for 54% (N=155) of the total single-sherd vessel batches, most of them located in the cap (Zone III) or from mixed contexts within the mound. The abundance of vessel batches in Mound A is probably related to the greater volume of dirt removed in the excavation of this feature than that from the other features. Structure 2 accounts for half as many single-sherd vessel batches (25.8% or N=74) as Mound A, and represents the next major concentration. Low frequencies are evident in Structure 1 and Mound B, suggesting differences in activities or histories compared to those associated with Structure 2 and Mound A. Interestingly, the third highest representation of single-sherd vessel batches is the area around Mound A, accounting for 12.9% (N=37).

Complementary data are provided in Table 25, which concerns the distribution of multiple-sherd vessel batches. As was seen earlier (Table 24), Mound A accounts for a majority (41.5% or N=56) of the multiple-sherd vessel batches, while Structure 2 has 25.2% (N=34) of these vessel batches. Additional information comes from cases where sherds from multiple-sherd batches were recovered from different proveniences. Batches from Mound A and Structure 2 indicate a degree of association, accounting for 13.3% (N=18) of the multiple-sherd vessel batches. The provenience link between Mound A and Structure 2 is stronger than that

TABLE 24

DISTRIBUTION OF VESSEL BATCHES REPRESENTED BY 1 SHERD

(N = 287)

	Mound A		Structure 2		Structure 1		Mound B		Bet. A & B*		Md A area		Unknown		Total	
	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%
Undecorated	33	60.0/21.3	12	21.8/16.2	1	1.8/ 7.1	2	3.6/50.0	1	1.8/100	6	10.9/16.2	0	--/--	55	100/19.2
Brushed	38	46.3/24.5	29	35.4/39.2	5	6.1/35.7	1	1.2/25.0	0	--/--	8	9.8/21.6	1	1.2/50.0	82	100/28.6
Other Wet Paste	45	61.6/29.0	14	19.2/18.9	3	4.1/21.4	0	--/--	0	--/--	10	13.7/27.0	1	1.4/50.0	73	100/25.4
Engraved/ Slipped	39	50.6/25.2	19	24.7/25.7	5	6.5/35.7	1	1.3/25.0	0	--/--	13	16.9/35.1	0	--/--	77	100/26.8
TOTAL:	155	54.0/100	74	25.8/100	14	4.9/100	4	1.4/100	1	.3/100	37	12.9/100	2	.7/100	287	100/100

*Between Mounds A and B.

R% = Row percentage; C% = Column percentage.

TABLE 25

DISTRIBUTION OF VESSEL BATCHES REPRESENTED BY 2 OR MORE SHERDS

(N = 135)

	Mound A		Structure 2		Structure 1		Mound B		Md A area		Md A/Str 2		Md A/Strs 1/2	
	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%
Undecorated	7	46.7/12.5	1	6.7/ 2.9	0	--/--	0	--/--	0	--/--	2	13.3/11.1	0	--/--
Brushed	16	32.0/28.6	15	30.0/44.1	2	4.0/44.1	0	--/--	1	2.0/50.0	9	18.0/50.0	0	--/--
Other Wet Paste	13	38.2/23.2	10	29.4/29.4	0	--/--	1	2.9/100	1	2.9/50.0	3	8.8/16.7	0	--/--
Engraved/ Slipped	20	55.6/35.7	8	22.2/23.5	0	--/--	0	--/--	0	--/--	4	11.1/22.2	1	2.8/100
TOTAL:	56	41.5/100	34	25.2/100	2	1.5/100	1	.7/100	2	1.5/100	18	13.3/100	1	.7/100

	Mds A/B & Str 2		Struc 1/2		Md A & area		Str 2/other		Str 1/other		Total	
Undecorated	0	--/--	0	--/--	4	26.7/28.6	1	6.7/33.3	0	--/--	15	100/11.1
Brushed	1	2.0/100	0	--/--	4	8.0/28.6	1	2.0/33.3	1	2.0/50.0	50	100/37.0
Other Wet Paste	0	--/--	0	--/--	5	14.7/35.7	1	2.9/33.3	0	--/--	34	100/25.2
Engraved/ Slipped	0	--/--	1	2.8/100	1	2.8/7.1	0	--/--	1	2.8/50.0	36	100/26.7
TOTAL:	1	.7/100	1	.7/100	14	10.4/100	3	2.2/100	2	1.5/100	135	100/100

R% = Row percentage; C% = Column percentage.

between Mound A and its surrounding area. Mound B and Structure 1 continue to account for small percentages of the total vessel batches. Increasingly more specific data on possible activities are provided by the following distributions.

Table 26 correlates indigenous and presumed trade types with proveniences. This table (and the two following) is based on the combined total of single- and multiple-sherd vessel batches. Ripley Engraved (Table 25), which accounts for 78.9% (N=45) of the total typable engraved vessel batches, is concentrated primarily in Mound A where 53.5% (N=24) of the Ripley vessel batches are found. Less than half as many Ripley Engraved vessels (20% or N=9) are found in the fill of Structure 2 as were found in Mound A. The third most common location for Ripley Engraved vessel batches is the Mound A area, in which 15.6% (N=7) of the total were found. The engraved types presumed to have been traded into the site reflect a slightly different frequency of distribution, with Mound A having 41.7% (N=5), Structure 2 having 33.3% (N=4) and Structure 1 accounting for 16.7% (N=2). However, the small sample size for this trade group (N=12) tempers the significance of these distributions. Only one typable engraved vessel batch is known for Mound B.

In a similar fashion, the wet paste types are concentrated mainly in Mound A, with 42.5% (N=14) of the total trade and indigenous types. Sixty percent (N=12) of the Maydelle Incised vessel batches and 28.6% (N=2) of the presumed trade wet paste vessels were located in Mound A. Structure 2 accounts for the second largest concentration of typable wet paste vessels, 15.0% (N=3) of the Maydelle Incised vessels

TABLE 26

DISTRIBUTION OF TYPED VESSEL BATCHES

(N = 88)

	Mound A		Mound B		Structure 2		Structure 1		Md A/Stru 2		Md A/other		Md A area		Other		Total	
	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%
Ripley Engraved	24	53.3/82.8	1	2.2/100	9	20.0/69.2	0	--/--	2	4.4/100	1	2.2/100	7	15.6/87.5	1	2.2/100	45	100/78.9
Engraved trade	5	41.7/17.2	0	--/--	4	33.3/30.8	2	16.7/100	0	--/--	0	--/--	1	8.3/12.5	0	--/--	12	100/21.1
TOTAL:	29	50.9/100	1	1.8/100	13	22.8/100	2	3.5/100	2	3.5/100	1	1.8/100	8	14.0/100	1	1.8/100	57	100/100
Maydelle Incised	12	60.0/85.7	0	--/--	3	15.0/37.5	1	5.0/50.0	1	5.0/50.0	1	5.0/33.3	1	5.0/100	1	5.0/100	20	100/64.5
Pease Br-Inc	0	--/--	0	--/--	2	50.0/25.0	1	25.0/50.0	1	25.0/50.0	0	--/--	0	--/--	0	--/--	4	100/12.9
Wet paste trade	2	28.6/14.3	0	--/--	3	42.9/37.5	0	--/--	0	--/--	2	28.6/66.7	0	--/--	0	--/--	7	100/22.6
TOTAL:	14	45.2/100	0	--/--	8	25.8/100	2	6.5/100	2	6.5/100	3	9.7/100	1	3.2/100	1	3.2/100	31	100/100

R% = Row percentage; C% = Column percentage.

and 42.9% (N=3) of the presumed trade wet paste vessels. Of the two distributions, the presumed trade wet paste group is most susceptible to sampling error because of the extremely small sample size (N=7). The distribution of Pease Brushed-Incised - a type more widely identified by body rather than rim treatment - is skewed by difficulties of definition. Since the vessel batches are based on rim sherds, the small sample size of Pease vessels (N=4) does not accurately reflect the representation of this type. Among the vessel batches, Pease Brushed-Incised is absent in Mound A, but 50% (N=2) of the four Pease vessel batches are found in Structure 2. Mound B lacks any typable vessel batches.

Considering the limitations (see Chapter 6) involved in defining types, the overall distribution indicates a major clustering of both engraved and wet paste types in Mound A and its surrounding area, with the next most frequent locus in the Structure 2 fill. Typable vessels are distributed unevenly, being found more often in discrete locations, rather than in multiple proveniences.

A more revealing distribution is shown in the relationship between provenience and shape (Table 27). A strong contrast, enhanced by similar sample sizes, is indicated between shapes found in Mound A and Structure 2. Mound A contains 48.2% (N=27) of the bowls, but only 34% (N=17) of the jars. The reverse holds true for Structure 2, which has 21.4% (N=12) of the bowls but 48% (N=24) of the jars. The sample size of the bottle category is too small to be meaningful, but it does parallel the distribution of bowls. Other proveniences accounting for a significant portion of the total bowls are the Mound A area (10.7%) and

TABLE 27

DISTRIBUTION OF VESSEL BATCHES WITH IDENTIFIABLE SHAPE

(N = 109)

	Mound A		Structure 2		Structure 1		Mound B		Md A/other		Md A/Stru 2		Md A area		Other		Total	
	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%
Carinated bowl	15	46.9/55.6	5	15.6/41.7	1	3.1/50.0	0	--/--	0	--/--	6	18.8/85.7	5	15.6/83.3	0	--/--	32	100/57.1
Probable bowl	9	47.4/33.3	7	36.8/58.3	1	5.3/50.0	0	--/--	1	5.3/100	0	--/--	1	5.3/16.7	0	--/--	19	100/33.9
Simple bowl	2	66.7/ 7.4	0	--/--	0	--/--	0	--/--	0	--/--	0	--/--	0	--/--	1	33.3/100	3	100/ 5.4
Compound bowl	1	50.0/ 3.7	0	--/--	0	--/--	0	--/--	0	--/--	1	50.0/14.3	0	--/--	0	--/--	2	100/ 3.6
TOTAL:	27	48.2/100	12	21.4/100	2	3.6/100	0	--/--	1	1.8/100	7	12.5/100	6	10.7/100	1	1.8/100	56	100/100
Evert rim jar	10	32.3/58.8	13	41.9/54.2	2	6.5/100	0	--/--	3	9.7/100	1	3.2/100	1	3.2/100	1	3.2/100	31	100/62.0
Cylindrical jar	0	--/--	5	83.3/20.8	0	--/--	0	--/--	0	--/--	0	--/--	1	16.7/50.0	0	--/--	6	100/12.0
Straight jar	6	50.0/35.3	6	50.0/25.0	0	--/--	0	--/--	0	--/--	0	--/--	0	--/--	0	--/--	12	100/24.0
Probable jar	1	100/ 5.9	0	--/--	0	--/--	0	--/--	0	--/--	0	--/--	0	--/--	0	--/--	1	100/ 2.0
TOTAL:	17	34.0/100	24	48.0/100	2	4.0/100	0	--/--	3	6.0/100	1	2.0/100	2	4.0/100	1	2.0/100	50	100/100
Bottles	2	66.7/100	1	33.3/100	0	--/--	0	--/--	0	--/--	0	--/--	0	--/--	0	--/--	3	100/100

R% = Row percentage; C% = Column percentage.

the Mound A-Structure 2 link (12.5%). No specific shapes are evident in the sample from Mound B. Structure 1 has similar distributions of bowls and jars, both forms representing about 4% of the respective totals. Table 27 also shows the wide distribution of both the carinated bowl and everted rimmed jar, possibly due to their relatively large sample sizes (Fig. 23) and their ease in identification.

From the distribution of vessel batches having a definable shape, one could predict the distribution of presumed cooking vessels. Table 28 presents the provenience data for the probable cooking vessels (recognized by the presence of soot) and for those bowls and jars lacking soot. Vessels having possible soot deposits are excluded from this table. Structure 2 contains a higher frequency (47.1% or N=8) of sooted (i.e., cooking) jars than does Mound A with 35.3% (N=6). In fact, only three other sooted jars are recognized from the entire site. Jars presumably not used for cooking (i.e., unsooted) are found equally represented in both Mound A and Structure 2, both loci accounting for 42.1% (N=8).

These findings for jars contrast with those for sooted and nonsooted bowls. Eighty percent (N=4) of the sooted bowls (function unknown) are located in Mound A fill, rather than Structure 2. Bowls without soot also prevail in Mound A, accounting for 46.8% (N=22) of the total class. Structure 2 has 25.5% (N=12) of the unsooted bowls, while the Mound A-Structure 2 and Mound A area proveniences each have 8.5% (N=4). Clearly, Mound A contains more bowls, while Structure 2 has more jars, a conclusion that requires statistical confirmation.

Chi-square analyses, run on the data presented in Tables 26-28,

TABLE 28

DISTRIBUTION OF SOOTED VESSEL BATCHES

(N = 52)

	Mound A		Structure 2		Structure 1		Other		Md A/Str 2		Md A/other		Md A area		Total	
	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%	No.	R%/C%
Jars w/ soot	6	35.3/42.9	8	47.1/50.0	1	5.9/100	1	5.9/100	0	--/--	1	5.9/50.0	0	--/--	17	100/47.2
Jars w/o soot	8	42.1/57.1	8	42.1/50.0	0	--/--	0	--/--	1	5.3/100	1	5.3/50.0	1	5.3/100	19	100/52.9
TOTAL:	14	38.9/100	16	44.4/100	1	2.8/100	1	2.8/100	1	2.8/100	2	5.6/100	1	2.8/100	36	100/100
Bowls w/ soot	4	80.0/15.4	0	--/--	0	--/--	0	--/--	1	20.0/20.0	0	--/--	0	--/--	5	100/ 9.6
Bowls w/o soot	22	46.8/84.6	12	25.5/100	2	4.3/100	2	4.3/100	4	8.5/80.0	1	2.1/100	4	8.5/100	47	100/90.4
TOTAL:	26	50.0/100	12	23.1/100	2	3.8/100	2	3.8/100	5	9.6/100	1	1.9/100	4	7.7/100	52	100/100

R% = Row percentage; C% = Column percentage.

indicate the likelihood that the distributions of type, shape and sooted/non-sooted bowls and jars are due to chance rather than patterned activity. For all tables, only the two major loci for vessel batch occurrence are compared; the sample sizes of the other proveniences are too small for valid statistical manipulation. The data from Table 28 was corrected for small sample sizes. The tests indicate that the distributions of types and sooted-non-sooted vessels (Tables 29-31) are statistically random, but that the distribution of shapes is significant (Table 32). Further support for the importance of this distribution is evident in the moderate value of the contingency coefficient. These results corroborate the frequencies in Table 27, and suggest that statistically different assemblages are represented by the vessel batches found in the fill of Mound A and Structure 2.

Discussion of Intrasite Patterns

Before discussion the behavioral inferences to be drawn from the vessel batch distributions, it is important to review the cultural contexts of the major analytical proveniences.

Except the fireplace basins in Mound A and the hearth in Mound B, all excavated mound deposits are comprised of secondary fill, presumably derived from adjacent borrow pits (i.e., the mound caps) or from unknown sources (i.e., Zone II in Mound A). Only Zone I, under Mound A, is comprised of two soil horizons. Among the non-mound proveniences, Structure 1 lacks a cultural stratum, while Structure 2 consists of secondary fill that represents a discrete midden.

Since the strata associated with the two excavated mounds and

TABLE 29

CHI-SQUARE TEST COMPARING DISTRIBUTIONS OF SOOTED AND NON-SOOTED JARS FROM MOUND A AND STRUCTURE 2

	Mound A	Structure 2	Total
Jars with soot	6	8	14
Jars without soot	8	8	16
Total	14	16	30

χ^2 = .15; df = 1; not significant at .05

TABLE 30

CHI-SQUARE TEST COMPARING DISTRIBUTIONS OF SOOTED AND NON-SOOTED BOWLS FROM MOUND A AND STRUCTURE 2

	Mound A	Structure 2	Total
Bowls with soot	4	0	4
Bowls without soot	22	12	34
Total	26	12	38

χ^2 = 1.09; df = 1; not significant at .05; Yates' correction for continuity used

TABLE 31

CHI-SQUARE TEST COMPARING DISTRIBUTIONS OF SHERDS WITH WET PASTE AND ENGRAVED/SLIPPED TREATMENTS FROM MOUND A AND STRUCTURE 2

	Mound A	Structure 2	Total
Wet Paste	29	13	42
Engraved/Slipped	14	8	22
Total	43	21	64

X^2 = .18; df = 1; not significant at .05

TABLE 32

CHI-SQUARE TEST COMPARING DISTRIBUTIONS OF BOWLS AND JARS FROM MOUND A AND STRUCTURE 2

	Mound A	Structure 2	Total
Bowls	27	12	39
Jars	17	24	41
Total	44	36	80

X^2 = 6.23; df = 1; significant at .05; c = .26

structures are not in situ accumulations, the artifacts within these strata must derive from activities which took place in other areas of the site. Therefore, analysis of the vessel batches from these proveniences does not connote the activities that occurred within the mound or non-mound structures, but it can specify the range of activities represented by the ceramic refuse in the fill. In other words, intrasite disposal patterns can be studied for differences in inferred activities.

Because most of the Mound A Zone III fill probably originated from adjacent borrow pits, refuse within this zone may relate to 1) activities associated with the special purpose buildings within the mound or 2) activities occurring elsewhere at the site. According to the second possibility, cultural or, less probably, natural causes were responsible for the dumping or scattering of debris near the buildings. Regardless of the location of the activities, the ceramic assemblage in the mound's fill can be characterized as having a high percentage of bowls (both sooted and unsooted) and bottles, as well as most of the recognizable typed vessels.

These assemblage characteristics contrast well with those exhibited by the ceramic debris found within Structure 2. Considered a discrete midden, the fill within Structure 2 definitely contains artifacts from activities that occurred outside the structure; cultural deposition - disposal of trash - is probably responsible for the accumulation of material. Compared to Mound A, the vessel batches associated with this midden include more jars of every identified shape, including a majority of sooted jars. Bowls are half as frequent as in Mound A, and sooted bowls are absent. Of the typable vessels, only Pease Brushed-

Incised has a higher representation here than in Mound A.

From the vessel batches found in these two loci, different activities are inferred. The activities contributing the debris for the Mound A fill used more bowls and bottles; some of the bowls were sooted, but whether for cooking or ritual functions is unknown. Jars are the dominant form associated with the fill of Structure 2; recognizable are cooking forms, although storage vessels are possibly present as well. The chi-square results and Pearson's contingency coefficient for vessel shape (Table 32) confirm the significant statistical relationship that differentiates both loci.

The clarity of this contrast is strengthened by the negative ceramic data from Structure 1 and Mound B, both of which contain too few vessel batches to define specific activities. The fill of Mound B, considered sterile, was probably dug from a nearby borrow pit. The scarcity of artifacts within the fill suggests that activities involving less artifact disposal took place in this area. The nature of the different activities and disposal patterns evident around Mound A and Mound B relate to different uses of the hearth (Mound B) and the structures (Mound A). Even less can be inferred about the activities associated with Structure 1. Since Structure 1 lacks any cultural strata, artifacts found within the area circumscribed by postholes could relate as readily to the use of Structure 1 as to the Mound A area.

In sum, the distribution of vessel batches from Whelan yields data that can be related to intrasite activities. Two major features (Mound B and Structure 1) can be assessed by negative evidence indicated by the low representation of vessel batches. Activities or disposal patterns associated with each differ considerably from those inferred for Mound A and Structure 2. Differences in type, vessel shape and vessel function are evident between the assemblages in these latter loci, although only the distribution of vessel shape was statistically significant. Two explanations could account for these differences: activities or dumping practices; either explanation assumes that other activity loci are present. The occurrence of 18 vessel batches with sherds from both Mound A and Structure 2 suggests that these areas are in some way related, but whether from natural or cultural factors is unknown.

Summary

The Whelan site is considered to have been relatively intact prior to excavation. An analytical provenience system, set up to create culturally relevant units, is the basis for 1) a study of ceramics in Mound A that assesses their temporal similarities, and 2) a vessel batch distribution that examines intrasite patterns. No significant temporal variation could be defined on the basis of the Mound A sherd distributions. In contrast, differences in the vessel batches found in the fill of Structure 2 and of Mound A are evident, and suggest differential activities or dumping practices.

Chapter 8

INTERSITE COMPARISONS

The primary question addressed by this chapter is: in terms of probable function, how do the ceramics from the Whelan site compare with those from other culturally and temporally similar Caddoan mound centers? Ideally, comparisons should also be made with contemporaneous Whelan Phase habitation sites. This, unfortunately, is not possible since all such sites are represented only by small surface collections, which are not directly comparable with the large, subsurface collection from Whelan.

The following comparisons are somewhat cursory, being based on available data in published sources. Because most of the ceramics from the sites of interest to this study have not been analyzed in vessel batches, generalizations about vessel function have been drawn from sherd data. The first comparisons are with the assemblages from the five other Whelan Phase mound sites. Next, the sherds from a Bossier Focus ceremonial center (Werner Mound) and a habitation site (Montgomery) are contrasted; then the ceramics from two Late Caddoan ceremonial centers, the Belcher Mound and the A.C. Saunders site, are compared to those from Whelan. A final section discusses the usefulness and importance of each collection as a source of comparative data and presents the behavioral implications.

The Whelan Phase Mound Sites

The Whelan Phase mound sites are similar in each having at least one mound, Ripley Engraved and Pease Brushed-Incised as the dominant pottery types and artifact collections recovered from excavation or extensive testing. Comparison of the assemblages from these sites with that from Whelan is based on sherd frequencies of decorative techniques. Of the six Whelan Phase mound sites, Whelan is the only one for which vessel batches have been sorted.

The assemblages from all of the known Whelan Phase mound sites show a remarkably similar distribution of decorative techniques (Table 23), despite the considerable difference in the size of each collection. Undecorated and wet paste treatments consistently dominate, accounting for between 74% and 93% of each collection, while engraved and slipped sherds together comprise between 5% and 16%. Assuming that these differences in frequencies reflect more specific differences in the nature or intensity of activities, the prevalence of wet paste treatments at all Whelan Phase mound sites suggests that activities involving jars - used for cooking and storage - dominated. Albeit cursory, these data also reveal the apparent homogeneity of the Whelan Phase mound site collections.

Two Bossier Focus Sites

All the Bossier Focus sites are comparable with the Whelan Phase sites because the former are temporally equivalent, geographically close and similar in socio-cultural adaptations to the latter. Speci-

TABLE 33

FREQUENCIES OF DECORATIVE TECHNIQUES AT WHELAN PHASE MOUND SITES

	Harroun*	Dalton*	Sam Roberts*	Segal*	Chastain*	Whelan
Undecorated	46%	52%	44%	41%	29%	38%
Wet Paste:	39%	38%	36%	52%	45%	50%
Brushed	30%	27%	26%	42%	40%	37%
Incised	7%	7%	6%	6%	2%	9%
Punctated	1%	2%	3%	3%	2%	3%
Misc WP	1%	2%	1%	1%	1%	1%
Engraved	16%	4%	13%	4%	6%	9%
Slipped	--	2%	1%	1%	2%	1%
Unclassified	--	4%	7%	3%	19%	3%
TOTAL	100%	100%	100%	100%	100%	100%
No. of Sherds:	560	1972	2418	3954	1401	13578

Misc WP = Miscellaneous wet paste; Unclass = Unclassifiable.

*Frequencies calculated from raw data presented in Thurmond (1981).

fically, the ceramic assemblages from two Bossier Focus sites are compared to see if differences between assemblages from a ceremonial and a habitation site can be determined.

Both sites under consideration have large subsurface collections, recovered from the major feature at each site. The J.C. Montgomery site, the habitation site, had a discrete midden, but no structures. Werner Mound, on the other hand, lacked evidence for domestic structures or a midden, but did have a mound which capped an exceptionally large structure having ash pits, a storage crib and an interior circle of roof supports (Webb 1983:217-221). Because these two sites clearly are functionally distinct, they provide good data sets for comparing the ceramics from a ceremonial and a habitation site.

From Table 34, some trends are apparent, the most notable being the similarities in wet paste treatments at both sites. Although the frequency of brushed and ridged sherds differ between the two sites, the overall wet paste frequencies are comparable. Engraved sherds are twice as common at Werner Mound as at Montgomery, but the frequency of plain sherds remains fairly constant. The relative frequencies of the stamped and noded sherds are too small to reveal any significant difference.

Based on the data provided, I see no clear-cut functional difference between the two assemblages. However, Webb does differentiate between the assemblages in terms of temper, quality of surface polish and frequency of trade pieces. In general, the ceramics from Werner have slightly more shell tempering, less bone tempering, are more highly polished and include more trade ware than those found at Montgomery.

TABLE 34

BOSSIER FOCUS ASSEMBLAGES FROM CEREMONIAL AND HABITATION SITES

		Montgomery*			Werner Mound**	
		No.	Percent		No.	Percent
Undecorated		816	36.60		2099	34.70
Wet Paste:		1306	58.65		3234	53.58
Brushed	783			2775		
Ridged	216			34		
Incised	159			269		
Punctated	148			156		
Engraved		101	4.50		647	10.70
Stamped		3	.10		52	.90
Noded		-	-		9	.15
TOTAL		2226	99.85		6041	100.03

*Data taken from Webb (1983: Table 3).

**Data taken from Webb (1983: Table 7).

These differences he attributes to temporal factors, with Montgomery having an assemblage spanning early to well-developed Bossier times (1983:207) and Werner having one representative of a well-developed Bossier Focus assemblage (ibid:222).

The results from a comparison of the decorative techniques on sherds suggest that no significant functional differences exist between the two kinds of Bossier Focus assemblages. While other types of analyses, including a study of vessel batches, may alter this conclusion, the present results provide an important working assumption that similar kinds of activities occurred at both sites, an inference that may be applicable for the Whelan Phase as well.

The Belcher Mound

The whole vessel collection from the Belcher Mound, a stratified mound site important in establishing the chronology of northwest Louisiana, provides yet another useful body of information on decorative techniques and shapes at a Late Caddoan ceremonial center. Comprising the vessel count (Table 35) are the whole vessels associated with separate floors in the mound; excluded are the vessels associated with the burials. Sherd tallies from the excavations and surface collections are also included in the table.

From Table 35 it is clear that engraving dominates the vessel collection, and that bowls and bottles are the primary shapes found. These results contrast sharply with the sherd data, in which wet paste and undecorated treatments together account for 88.8% (N=17,151) of the collection. Although the sherd counts from Whelan (Table 2) generally

TABLE 35

DISTRIBUTION OF DECORATIVE TECHNIQUES
AMONG SHERDS AND VESSELS FROM BELCHER MOUND

	Sherds		Vessels	
	Number	Percent	Number	Percent
Engraved	2174	11.2	23	63.9 (bowls and bottles)
Wet Paste	8624	44.6	11	30.6 (jars)
Undecorated	8527	44.2	2	5.6 (bowls, jars and bottles)
TOTAL	19,325	100.0	36	100.0

Wet Paste consists of all incised, punctated, brushed and miscellaneous wet paste treatments.

Data taken from Webb (1959: Tables 1 and 2).

TABLE 36

DISTRIBUTION OF IDENTIFIABLE SHAPES AMONG VESSEL BATCHES
FROM THE WHELAN AND SAUNDERS SITES

	Saunders*		Whelan	
	Number	Percent	Number	Percent
Bowls	244	50.4	57	52.3
Jars	219	45.2	50	45.9
Bottles	21	4.3	2	1.8
TOTAL	484	100.0	109	100.0

Vessel batches with identifiable shape comparise 37% of the 1291 vessel batches from Saunders, and 26% of the 422 vessel batches from Whelan.

*Data taken from Kleinschmidt (1982:191).

correspond to those at Belcher, the vessel breakdown by shape and by decorative technique does not parallel the Whelan vessel batch data in two areas. First, the 422 vessel batches from Whelan are dominated by wet paste treatments (Table 6), whereas the vessels from Belcher are predominantly engraved. Second, the 109 Whelan vessel batches confidently identified as to shape are almost evenly split between jars and bowls (Fig. 23), while the vessels from Belcher are mainly bowls and bottles. Of the two Whelan vessel batch groups, the former represents the minimum number of vessels used and/or disposed at the site, a better intersite comparative yardstick. Thus, compared to Belcher's whole vessel collection, the Whelan vessel batches consist of more wet paste treatments, and therefore, probably more jars.

However, this interpretation may be spurious because of the incongruity of the analytical units from both sites, Belcher having been analyzed in terms of whole vessels and sherd counts and Whelan in terms of vessel batches. An analysis complementary to that employed for the Whelan site ceramics would involve separation of sherds into vessel batches to make comparable data sets.

The A.C. Saunders Site

Of the sites being considered, the A.C. Saunders site, a Frankston Focus mound site, can be readily compared with the Whelan assemblage because it has the only sherd collection which has been analyzed by vessel batches (Kleinschmidt 1982). Most of the sherds were recovered during excavation of a large midden.

Table 36 presents the vessel batch shape distribution for both the Whelan and Saunders sites. Despite the differences in the number of vessel batches recognized, there is a striking parallel in the frequency of vessel shapes represented by the ceramics in both collections. At both sites, similar activities involving bowls and jars are inferred from the vessel batches.

Discussion

From the preceding data, certain limitations are evident. First, intersite ceramic comparisons are complicated by the use of different analytical units which prevent fully comparable data bases. Obviously, whole vessel collections, such as the one from Belcher Mound, give the most detailed functional information from which activities can be inferred. When complete vessels are lacking, an analysis based on vessel batches (represented by the Whelan and Saunders collections) is an effective method for sorting out specimens that can be used for functional and typological studies. Assemblages analyzed only by sherds, as represented by the other Whelan Phase mound sites and the Bossier Focus sites, carry the least specific functional information, yet tend to be the most common of the three analytical groups.

Second, variation in frequencies of decorative techniques can be attributed to temporal as well as functional causes. This overlap emphasizes the need for more vessel batch analyses with shape identification to ascertain vessel function and thereby infer activities.

The intersite comparisons presented in this chapter are valuable, but yield variable kinds of information about ceramic similarities to the Whelan site. Although the analytical categories most similar to those used in my studies of the Whelan ceramics are those from the Saunders site, the value of this comparison must be tempered by the fact that Saunders is not as temporally or culturally analogous to the Whelan site as the Bossier Focus sites. From these two functionally dissimilar Bossier Focus sites lies the greatest potential source of information. However, because only sherd comparisons based on decorative techniques are available, the level of comparison must remain tentative until more refined functional analyses are performed. In like manner, the Whelan Phase mound sites are the most similar to Whelan in terms of time and affiliation, but have also been analyzed by sherds, the least reliable indicator of function. Finally, the vessel data from Belcher Mound is useful for functional comparison, but contradicts the interpretations based on the sherds.

Returning to the question posed at the beginning of this chapter, the Whelan ceramic assemblage is not significantly different from the assemblages at the five other Whelan Phase mound sites, the two Bossier Focus sites and the Saunders site. Differences are apparent in comparison with the Belcher Mound vessel assemblage, although the sherd assemblage characteristics are basically equivalent with those from Whelan. The dominance of wet paste treatments at eight of the nine sites implies the prevalence of jars, presumably used in cooking and storage. These domestic activities are indicated by the extant data at all the ceremonial sites (except possibly Belcher Mound) and the single habitation site, and suggest a high degree of homogeneity at least in terms of the attributes studied. An untested implication is that context, which Sears (1973) stipulated as being paramount to the activities, may be more important than the activities themselves in evaluating ceremonial sites.

Summary

Intersite comparisons with the ceramic assemblages from nine Late Caddoan sites demonstrate a high degree of similarity in terms of decorative technique frequencies among sherds and vessel forms among vessel batches. Based on the prevalence of wet paste treatments, the behavioral implication from these comparisons is that cooking and storage activities dominated at these sites. There appears to be no functional difference between ceremonial and habitation sites, at least in terms of the attributes and sites considered.

Chapter 9

SUMMARY AND CONCLUSIONS

The primary purpose of this study has been to analyze the vessel ceramics from the Whelan site, a Late Caddoan mound center in northeast Texas. These artifacts were studied to determine the temporal placement of the site, as well as to examine the nature and distribution of the activities occurring at a ceremonial site.

Prior to the ceramic analysis, a review of the Whelan site excavation procedures and results was presented. The investigations at Whelan, carried out under the supervision of E.M. Davis, revealed the presence of two non-mound structures and at least one probable borrow pit in addition to the four mounds evident. Of the two mounds excavated, Mound A was found to contain the remains of at least three special purpose buildings, while Mound B capped a large hearth. The larger non-mound building (Structure 2) was identified as a residence, and the smaller one (Structure 1) as an elevated granary or storage crib.

Although few refinements could be made to these interpretations, I re-evaluated the associative contexts in Mound A and Structure 2. A stratified zone of sand, ash, clay and silt bands thought initially to derive from the use of the earliest building under Mound A is now interpreted to predate the hearth associated with that structure (3 C). The deposition of this zone may represent the first in a series of complex events relating to the use of Mound A. Within Structure 2, the midden fill originally considered to have accumulated during the building's use, is now interpreted to postdate the occupation of that structure.

A sizeable collection of artifacts, which was briefly analyzed in Davis' (1958) unpublished preliminary report, was recovered from these investigations. Of this collection, 13,143 vessel ceramics were selected for restudy because of their usefulness in answering questions related to chronology and site function. A typological analysis of the sherd collection has confirmed the prevalence of at least the two indigenous types, Ripley Engraved and Pease Brushed-Incised, and has also identified trade pieces from southwest Arkansas, the Texarkana area and northwest Louisiana. Comparative typological data supports a Late Whelan Phase temporal placement for the site.

Separation of the sherds into vessel batches facilitated study of functional questions. The attributes of vessel shape, decorative technique, orifice diameter and presence of soot were important in determining vessel use. From the analysis of 422 vessel batches, the following results are obtained:

1) Four bowl forms, four jar forms and one indeterminate bottle form were identified.

2) There is a strong correlation between decorative technique and shape, with most wet paste decoration occurring on jars, and most engraved/slipped treatments on bowls and bottles.

3) The prevalence of wet paste decoration among the vessel batches suggests that jars dominate the collection.

4) A bimodal distribution of sizes based on differences in orifice diameter is evident for everted rimmed jars and, less strongly, for carinated bowls. The presence of discrete vessel sizes suggests stand-

ardization of forms, perhaps to facilitate the measurement of food or to serve different functions.

5) The presence of soot identified cooking vessels. Vessel functions associated with other vessel shapes have been inferred from ethnohistoric sources.

6) From the prevalence of jars, cooking and storage are inferred to be the major activities represented by the vessel ceramic collection.

The vertical and horizontal distribution of the ceramics provided the basis for evaluating the possibility of temporal change and for identifying intrasite activity patterns. An attribute study of sherds from two stratified contexts in Mound A indicated that no clearly defined temporal change was evident in the ceramics used and/or disposed at the site. With the temporal issue settled, vessel batches, concentrated mainly in Mound A and Structure 2, were compared for functional differences that could be translated into behavioral statements. Mound A was found to contain more bowls, while Structure 2 had more jars, a difference found to be statistically significant. Since both contexts were secondary, the differences can be attributed to variable activities or disposal patterns, neither of which can be more specifically described. Albeit tenuous, these findings fail to support the explicit assumptions (e.g., McCormick 1973a; Sears 1973) that ceremonial artifact assemblages will reflect both domestic and "specialized" activities. The Whelan assemblage contains evidence for predominantly storage and cooking, both domestic in nature.

Intersite comparisons with other Late Caddoan mound centers suggest that similar activities - inferred by the dominance of wet paste treatments in sherd counts - occurred. Comparison of a ceremonial assemblage and a habitation assemblage from the culturally analogous Bossier Focus indicates that clear-cut functional differences between the ceramics recovered from these two kinds of sites cannot be determined from the available data. Among the nine sites considered, the prevalent use of sherds as the basis for analysis affects the reliability of the functional inferences that can be drawn, which underscores the need for more vessel-oriented studies to confirm these comparative results.

In sum, this thesis provides the first detailed analysis of the ceramics from the Whelan site and offers interpretations related both to function and chronology. My limited review of the primary feature data from Whelan demonstrates the potential for additional analyses and strengthens the interpretation of the site as a ceremonial center. Moreover, my use of vessel batches should facilitate future functional studies.

From the results of my analysis, it is possible to suggest several methodological improvements over those employed in this study. Braun (1982a:114-115) has summarized three major areas from which to extract data related to vessel use: 1) the physical properties of vessels (including temper particle and pore size, shape, density and arrangement), 2) performance characteristics (including breakage strength, resistance to thermal shock and thermal conductivity), and 3) analysis of the physical effects of vessel use (including fracture and spalling patterns, residue and wear patterns). Future functional studies must incorporate more information from these complimentary areas of research to make more accurate inferences about vessel function and site activities.

I also strongly recommend an intersite comparison of the other Whelan Phase mound site assemblages, relying on vessel batch data rather than sherd counts. These data would be useful in further evaluating the similarities and/or differences in activities among the sites, and in determining the nature of their interrelationships.

Finally, excavation priorities should be given to habitation sites in order to define the range of activities and features at non-mound sites. This information is particularly needed for the Whelan Phase, as no habitation site assigned to this phase has been excavated to date. The proposed Black Cypress and Marshall Dams may provide excellent opportunities to do so. The proximity of these areas to the Lake o' the Pines indicates a strong possibility of Whelan Phase settlements. Of special importance would be the investigations along Black Cypress Creek, as it lies between Lake o' the Pines and the Texarkana-southwest Arkansas area, from which much influence is evident in the Whelan ceramics.

Appendix I

DEFINITIONS OF ATTRIBUTES USED IN VESSEL BATCH ANALYSIS

Vessel Batch Number is the serial number that designates each vessel batch.

Catalogue Number(s) of Sherd(s) is the unique number assigned during the original analysis that refers to the sherd's provenience.

Number of Sherd(s) in Vessel Batch is the number of sherds comprising each vessel batch. Each sherd with a unique catalogue number in the vessel batch is tallied separately; sherds having the same catalogue number are counted as one sherd.

Analytical Provenience is the set of provenience categories used in my analysis of the site. Each provenience, which has been defined as discretely as possible, corresponds to a cultural, natural or a combination of cultural and natural strata:

1) Mound A cap, the uppermost zone of Mound A, consists of dark brown to brown sand. It is considered to be a secondary deposit (mound fill) and is also termed Zone III (Fig. 6).

2) Mound A structural zone, the middle zone in Mound A, consists of stratified sands, ash, silts and clay bands as well as charred materials. It is considered to be a secondary deposit associated with the activities during and after (and possibly before) the use of the structures within the mound. It is also termed Zone II (Fig. 6).

3) Mound A submound, the bottom zone of Mound A, consists of the original humic zone and underlying brown sand, associated with activities that preceded the structures. It is differentiated from the cap

only when the humic zone is present. It is also termed Zone I (Fig. 6).

4) Structure 2 includes the culturally deposited dark brown sand (midden fill) that postdates the use of the structure, and the natural underlying deposit of brown sand.

5) Structure 1 consists of a natural deposit of brown sand, which lacks a cultural zone.

6) Mound B consists of the brown sand mound fill and the burned area associated with the interior features. The mound fill is considered to be a secondary deposit.

7) Mound A mixed represents uncertain proveniences within Mound A.

8) Mixed Mound A cap/submound represents fill from Zones III and I that cannot be separated because of excavation in arbitrary levels.

9) Mixed Mound A submound/structural zone represents fill from Zones I and II that cannot be separated because of excavation in arbitrary levels.

10) Mixed Mound A cap/structural zone represents fill from Zones III and II that cannot be separated because of excavation in arbitrary levels.

11) Mound A vicinity includes the test pits adjacent to Mound A that consist of a natural deposit of brown sand. Artifacts within this area may be related to activities associated with the structures in the mound.

12) Test pits around Mound A includes the test units that do not adjoin Mound A. Their fill is a natural deposit of brown grading into

light brown sand. Artifacts within these units may represent a general surface scatter.

13) Test pits between Mounds A and B designates the test units between these mounds. Their fill is a natural deposit of brown grading into light brown sand. This area may represent a plaza.

14) Mound B vicinity includes the test pits adjacent to Mound B; these units consist of a natural deposit of brown sand which contains artifacts that may relate to the activities associated with the activities in Mound B.

Decorative Technique is the dominant technique (i.e., the one covering the most surface area) on the sherds of a vessel batch. Several decorative techniques (see below) have additional treatments that are considered of secondary importance. The following definitions are adapted from Good (n.d.), Hart (1982) and Verley (1964).

1) Undecorated lacks intentional surface decoration by one of the following techniques.

2) Incised is a wet paste decoration characterized by a single instrument having a blunt, sharp or bifurcated tip that is dragged or cut into the vessel surface. Punctations and applique occur as secondary treatments on some vessels.

3) Punctated is a wet paste decoration characterized by a single instrument of variable shape and sharpness that is pressed onto the vessel surface, leaving indentations that range from round to rectilinear to semilunar to linear. Applique occurs as a secondary treatment on some vessels.

4) Brushed is a wet paste technique in which decorative lines are tightly spaced, and are of variable length, width and depth. Separate strokes cannot be determined. The instrument used was probably split twigs. Punctations and applique occur as secondary treatments on some vessels.

5) Engraved is a dry/hard paste technique in which the design is scratched onto the vessel surface by a hard, sharp instrument. Lines can be filled with red (ocher) or white (shell) powder or paste. Punctations occur infrequently as secondary treatments.

6) Slipped is a technique in which a mixture of fine clay is applied to an entire vessel. Engraving occurs frequently as a secondary treatment.

7) Miscellaneous wet paste includes the other techniques that are done when the vessel surface is moist and malleable. This category includes:

a) Appliqued is a technique which consists of the addition of clay strips or nodules to the vessel surface.

b) Trailed is a technique similar to incising that produces broad, U-shaped, and frequently polished lines or grooves.

c) Combed is a technique that consists of carefully executed, uniform lines that appear to be done with a toothed instrument.

d) Pinched is a technique in which ridges are formed by pressing clay between the fingers.

e) Ridged is a technique similar to pinching that produces more pronounced ridges.

f) Neck Banded is a technique which consists of the incomplete smoothing of coils to produce overlapping bands.

g) Stamped is a technique that is similar to punctating, but is done with a toothed or notched instrument to produce evenly spaced indentations.

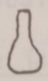
Type identifications, especially helpful in establishing the temporal and cultural affiliations of the vessel batches, are based on the definitions from the sources listed in Chapter 6. Constitutent types, recognized in the collection, are grouped below by their presumed origin. Descriptions and illustrations of each type have been given in Chapter 6.

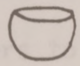
1) Indigenous refers to types that were produced at or near the site. The only indigenous types found are Ripley Engraved and Pease Brushed-Incised.

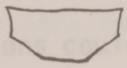
2) Possible indigenous refers to types that, being indigenous for the Titus Phase, may also be indigenous for the Whelan Phase. Types so identified are Maydelle Incised, LaRue Neck Banded and Harleton Applique.

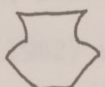
3) Presumed trade refers to types that are definitely considered to be produced at another site because of anomalous paste or decorative treatments. Within this category are Sinner Linear Punctated (a Bossier Focus type), Belcher Ridged (a Bossier/Belcher Focus type), Glassell Engraved (a Belcher Focus type), Barkman Engraved (a Texarkana Focus type), Washington Stamped/Combed (from southwest Arkansas), Holly Fine Engraved (an Alto Focus type) and Killough Pinched (a Frankston Focus type). Also included are the untyped, distinctive ceramics char-

acterized by stamping and by a combination of combing and pinching. Shape refers to the vessel form based on the morphological characteristics of sherds. The following descriptions furnish the discriminating shape criteria based on attributes recognizable from sherds. Corroboration of the predicted shapes was provided from the whole vessels at 41UR1, a Whelan Phase cemetery. The terminology used was adapted from Brown (1971), Hart (1982) and Shephard (1964).

1) Bottle - vessel form that is distinguished by a roughened interior; rims and necks are also sortable by their pronounced curvature. Vessel Form: 

2) Simple bowl - vessel form characterized by inverted rim orientation and strong curvature; interior surfaces are smoothed or polished. Vessel Form: 

3) Carinated bowl - vessel form characterized by sharp to subtle angular inflection point separating rim from body; this differs from a body/base juncture in being uniformly thinner and having a more pronounced joint; decoration is usually found above the carination. Vessel Form: 

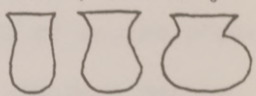
4) Compound bowl - vessel form characterized by a series of inflection point changes along the rim; frequently contains two bands of decoration. Vessel Form: 

5) Probable bowl - vessel form recognized by a vertical rim section that lacks curvature; a slight thickening at the edge opposite the lip may be evident; probably part of a carinated or compound bowl. Vessel Form: unknown; see above forms.

6) Cylindrical jar - vessel form characterized by a vertical

rim orientation and by little change in angle between body and rim (each body part usually decorated differently); only sherds that are at least four centimeters in length are included. Vessel Form: 

7) Straight rimmed jar - vessel form designated by a vertical rim and a definite change in vessel direction at the rim/body juncture; the body shape may be globular or elongated. Vessel Form: 

8) Everted rimmed jar - vessel form characterized by a strongly to gently everted rim and a pronounced rim/body juncture; the body form is probably globular or elongated. Vessel Form: 

9) Probable jar - vessel form recognized by apparent everted rim that lacks a rim/body juncture; the rim is too elongated to be a bowl. Vessel Form: unknown; see above forms.

Temper material refers to the intentional aplastic inclusions within the paste. Temper identifications were made along a fresh break, using both a fluorescent lamp and an illuminator for lighting. Identification was made with a binocular microscope, using 20-40x. Since no petrographic analysis was performed to confirm the temper categories, temper designations could be termed more appropriately "apparent temper" (Brown 1971:6). Definitions of the temper materials was based on the descriptions in Aten (1979), Black (1982), Brown (1971), Good (n.d.), Hart (1982), Kleinschmidt (1982) and Verley (1964).

1) Grog is characterized by small lumps of sharply delineated and differentially colored material that infrequently has visible temper; grog was easily identified in most cross-sections but difficult to determine in highly oxidized or reduced sherds. Unlike Kleinschmidt (1982:51), no distinction is made between clay lumps, burned clay and

sherds; all are considered grog according to my definition.

2) Sand is found as a natural inclusion in many local clays as an alluvial or secondary deposit, and is considered a possible tempering material when found in otherwise temperless sherds. Examination of the sand grain sizes does not indicate the bimodal size distribution that would confirm the use of sand for temper (Aten 1979:314).

3) Bone is characterized by chunky pieces of irregular outline and surface, or as amorphous chunks whose color ranges from white to tan to blue-gray to black. Color depends on the amount of oxygen present during vessel firing and the firing conditions of the bone before its use as temper. No distinction was made between burned and unburned bone because of the discussion in Black (1982:441), in which he suggests that burned bone works better as a temper than unburned bone.

4) Hematite is recognized as orange to bright red, opaque to granular inclusions that vary in size and form. Like sand, hematite may be a natural inclusion within the local ferruginous sandstone sources, and it has been recorded as a possible temper when it is more frequent and larger in size relative to the other paste inclusions.

5) Organic material consists of fibrous material that is easily recognized as dark brown to black, shiny linear fragments; sometimes this material is inferred from the presence of linear cavities. Organic material was probably an accidental inclusion in the paste.

Temper size refers to the average size of the temper particles evident in a sherd cross-section. Quantification was attempted by using a micrometer for measurement, but this technique was abandoned when both the micrometer and the temper could not be kept in focus simultaneously.

Therefore, I subjectively judged sizes, comparing my categories with those established by Colton (1953:25). According to his criteria, all of the Whelan sherds would be classified as coarsely tempered. I then devised my own size sort based on the recognizable extremes in temper sizes of the Whelan material.

1) Fine - temper particles < 1 millimeter in size.

2) Intermediate - temper particles between 1 and 2 millimeters in size.

3) Coarse - temper particles > 2 millimeters in size.

4) Fine-Intermediate - temper particles grading between these two sizes.

5) Intermediate-Coarse - temper particles grading between these two sizes.

Rim orientation is based on the orientation of the rim relative to a flat surface. No orientation was determined for rims with uneven, flanged or peaked lips. The following terminology was taken from Brown (1971:1920).

1) Vertical - rim perpendicular to a flat surface.

2) Everted - rim inclined outward.

3) Inverted - rim inclined inward.

Rim shape is based on the differences in thickness between measurements taken at the lip and the lowest rim extremity. The following categories were adapted from Brown (1971:19-20) and Stokes and Woodring (1981:160).

1) Direct - no change in rim thickness.

2) Thinned - rim tapers toward the lip.

3) Thickened - rim expands toward the lip.

4) Rolled out - rim bulged out on exterior edge of lip.

5) Angled - lip extends outward almost perpendicular to the vessel wall.

Lip form is the cross-sectional contour of a lip, defined by Brown (1971:20) as "the terminal surface of a vessel at the orifice." The following categories were adapted from Brown (1971).

1) Round - characterized by a convex surface.

2) Flat - characterized by flat, usually squared-off surface.

3) Intermediate - characterized by a lip form that may be round or flat but cannot be distinguished due to surface irregularities.

4) Pointed - characterized by a tapered surface.

5) Other - established as a catch-all category for all unclassifiable and miscellaneous lip forms.

Diameter of vessel orifice is based on a measurement of the vessel diameter at the interior of the lip, which is placed on a rim chart having concentric circles one centimeter apart. Diameters are rounded off to the nearest whole centimeter.

Presence of soot is based on microscopic examination of sherds. Soot deposits have been defined by Hally (1983b:8) as "a distinct surface layer with a lustrous finely cracked or checked surface." The differences between sooting and smudging have been discussed at length in Hally (ibid:8-10). A second type of soot was noted on the Whelan ceramics: it corresponded to the thin, black, lustrous droplets that Hally found near vessel rims in replicative firing experiments (ibid:8). An ambiguous category was established to account for deposits that are matte in finish, patchy, dark brown to black in color and resemble lichen - similar to the characteristics recognized by Black (1982:446) for deposits on sherds from Choke Canyon in south Texas. Additional analysis is necessary to determine whether this last group is soot.

1) Presence of soot - recorded if either of the first two conditions was met; indicated by surface of occurrence (see below).

2) Absence of soot - recorded if neither of the first two conditions was met; indicated by "No."

3) Possible presence of soot - recorded if the third condition was present; indicated by "?."

4) Surface of occurrence - refers to the interior (I) or exterior (E) surface upon which soot deposits were found. Occasionally, soot deposits were encountered on both surfaces (I/E).

APPENDIX II: RAW DATA FOR VESSEL BATCH ANALYSIS*

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
1	3342	1	1	1	--	8	1,3	2	2	1	1	30	No
2	13001	5	1	1	--	--	1	--	2	2	1	30	No
	10135		1										
	9906		1										
	3024		1										
	886		8										
3	15358	3	1	1	--	--	1,3,4	--	2	2	1	18	No
	15326		1										
	11434		1										
4	6819	3	4	1	--	3	3	1	1	4	1	≥24	No
	6021		4										
	5315		11										
5	12986	1	1	1	--	8	3,4	3	2	4	3	34	No
6	11690	1	3	1	--	--	1	3	2	1	2	10	I
7	3837	1	11	1	--	--	1	3	1	2	5	26	No
8	6106	1	3	1	--	7	3	3	1	3	1	≥26	No
9	13450	6	9	1	--	3	4,3	3	1	2	1	14	No
	13210		9										
	10607		1										
	10172		1										
	9386		1										
	7434		4										
10	14121	3	1	1	--	3	1,4	3	2	1	1	18	I
	12919		8										
	7669		1										

*Abbreviations and numbers correspond to categories defined in Appendix I.

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
11	12630	4	3	1	--	--	1,3	--	--	2	1	--	No
	5093		12										
	1315		7										
	1298		10										
12	13926	4	11	1	--	--	1	--	2	1	2	28	No
	12293		3										
	10804		11										
	2933		1										
13	13822	4	3	1	--	--	1,3	--	1	2	1	≥30	No
	9381		1										
	4571		9										
	4213		9										
14	14767	18	4	1	--	3	1	2	1	4	3	36	No
	14807		4										
	14300		4										
	14151		4										
	9013		1										
	8737		4										
	8033		4										
	6742		4										
	6699		4										
	6020		4										
	5849		4										
	3708		4										
	3327		4										
	2526		4										
	3677		4										
	1811		4										
	815		4										
	720		4										
15	9792	2	1	1	--	--	1	--	1	2	1	≥30	No
	1344		11										

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
16	15350	4	1	1	--	--	1	--	2	4	2	21	No
	13639		4										
	7290		4										
	4595		9										
17	9612	1	1	1	--	--	4,3,2	--	1	2	5	≥20	No
18	1007	1	13	1	--	2	4,1,3	2	3	1	1	8	No
19	15067	1	9	1	--	--	3	--	--	2	1	--	No
20	3751	1	9	1	--	2	1,2	3	3	1	5	≥20	No
21	8042	1	1	1	--	--	1	--	3	2	2	14	No
22	8300	1	12	1	--	--	3,1	--	1	2	1	-10	No
23	14046	1	4	1	--	--	3	--	1	2	1	12	No
24	5026	1	6	1	--	--	1,4	--	2	4	1	16	No
25	10167	1	1	1	--	--	1	--	1	1	1	--	No
26	12030	1	11	1	--	8	4,3	3	2	2	1	12	No
27	13808	1	1	1	--	--	1	--	1	1	2	≥36	No
28	15381	1	4	1	--	--	1	--	2	2	1	≥20	No
29	6813	1	6	1	--	--	3	--	2	1	1	≥20	No
30	8437	1	10	1	--	--	3	--	1	2	1	---	
31	9052	1	1	1	--	--	1	--	2	2	1	12	No
32	8701	1	10	1	--	--	1,2	--	2	2	1	--	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
33	10628	1	4	1	--	--	1,3	--	2	1	1	14	No
34	1087	1	11	1	--	--	4,1,3	--	2	2	1	$\geq$18	No
35	5255	1	4	1	--	--	1	--	1	1	1	$\geq$34	No
36	13328 10004 4480	3	10 9 9	1	--	2	1	5	3	1	1	9	No
37	9837	1	8	1	--	--	1	--	1	1	2	$\geq$24	No
38	12444	1	3	1	--	--	1	--	2	2	2	$\geq$16	No
39	15128	1	3	1	--	7	3,1	2	1	2	3	$\geq$18	No
40	11027	1	2	1	--	--	1	--	3	2	3	--	No
41	11295	1	2	1	--	--	1,3,4	--	2	2	1	$\geq$20	No
42	7040	1	2	1	--	--	3,4	--	2	1	1	$\geq$16	No
43	7039	1	2	1	--	--	3,1	--	2	2	1	$\geq$12	No
44	9714	1	1	1	--	--	1	--	1	1	2	$\geq$20	E
45	15336	1	1	1	--	--	2	--	2	2	1	$\geq$22	E
46	14709	1	4	1	--	--	1,4	--	2	4	1	$\geq$28	No
47	4484	1	9	1	--	--	1,2	--	1	1	3	$\geq$26	No
48	13091	1	3	1	--	--	1,4	--	2	1	1	$\geq$24	No
49	9465	1	4	1	--	--	1	--	1	2	1	$\geq$30	No
50	354	1	4	1	--	8	3,4	3	2	1	2	$\geq$30	E

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
51	7430	1	4	1	--	--	1	--	1	2	1	--	No
52	13769	1	9	1	--	--	1	--	2	2	1	≥28	No
53	10061	1	1	1	--	--	2	--	2	2	1	≥42	E
54	570	1	4	1	--	--	1	--	1	1	1	≥24	No
55	1679	1	1	1	--	--	1	--	2	1	1	≥16	No
56	5616	1	13	1	--	--	1,3	--	1	4	1	≥24	No
57	11703 11410	2	3 11	1	--	--	1	--	2	2	2	≥34	No
58	5918	1	5	1	--	--	1		1	3	2	≥14	E
59	5463	1	12	1	--	--	1		2	1	1	16	E
60	11836	1	4	1	--	--	1,4	--	1	2	1	≥14	?
61	4630	1	9	1	--	--	1	--	1	1	2	≥18	No
62	14456	1	1	1	--	--	1,3	--	1	2	1	≥14	No
63	15274	1	4	1	--	--	1	--	--	1	1	≥16	No
64	15359	1	1	1	--	--	1,3	--	--	--	2	--	No
65	12094	1	8	1	--	--	1,3,4	--	1	2	2	≥20	No
66	13285	1	3	1	--	--	3	--	1	1	1	--	No
67	12935	1	8	1	--	--	1,3	--	1	2	1	≥20	No
68	13434	1	9	1	--	--	3,1	--	1	2	2	≥16	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
69	13163 10845	2	1 9	1	--	--	1	--	1	1	2	≳34	No
70	11482 4590	2	9 9	1	--	3	1,3	3	2	2	--	≳26	No
71	8182	1	4	4	--	5	1,3	3	1	1	2	≳26	No
72	15084 4578	2	9 9	5	--	--	1,4	--	2	1	2	≳18	No
73	11713 4787	2	1 8	5	--	--	1	--	2	5	2	≳28	No
74	14476 1684	2	1 1	5	--	--	1,3	--	2	4	1	≳24	No
75	12470 8580	2	8 1	5	--	--	3	--	1	1	1	≳42	No
76	7769 1398	2	4 4	5	--	--	1,3,4	--	2	1	1	≳28	No
77	8729 7041	2	10 2	5	--	--	1	--	2	4	2	≳20	E/I
78	5745	1	5	5	--	5	1,3,4	3	2	1	1	14	No
79	15106	1	9	5	1	--	1,3,4	--	1	2	1	≳14	No
80	14104 8122	2	1 1	5	--	--	1,3	--	2	5	2	≳24	No
81	11679 4335	2	4 3	5	--	3	1	3	2	4	1	≳14	I
82	8375 1127	2	9 3	5	1	5	1,4	3	1	3	1	≳24	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
83	7754	1	4	5	--	3	1	5	2	4	1	≥10	No
84	60	1	4	5	1	--	1	5	2	4	1	≥18	No
85	4151	1	1	5	--	--	1	--	1	4	1	≥16	?
86	1842	1	11	5	1	--	1,4	--	1	1	1	≥28	No
87	1174	1	1	5	--	--	1,3	--	2	4	1	≥16	No
88	12005	1	1	5	--	--	1,3	--	2	2	4	≥24	No
89	10733	1	4	5	--	5	1,3,5	5	1	2	1	≥20	No
90	6353	1	1	5	--	--	1,3	--	2	5	2	≥24	No
91	3316	1	4	5	1	5	1,3	5	3	2	2	≥14	No
92	13158	1	1	5	--	5	3,1	3	1	2	1	--	No
93	12078	1	4	5	--	--	3,1	--	1	5	2	≥22	E
94	5723	1	5	5	--	--	1,3	--	2	2	1	≥16	No
95	4598	1	9	5	--	--	3	--	2	5	1	--	No
96	11648	1	4	5	1	--	1,4	--	1	5	2	≥16	No
97	12583	1	1	5	1	--	1	--	1	1	1	≥20	E
98	5295	1	1	5	--	--	1,3	--	1	2	1	≥14	No
99	1756	1	7	5	1	--	1,4	--	1	1	2	≥28	No
100	12046	1	8	5	--	--	1,4	--	1	2	1	≥16	No
101	5211	1	4	5	--	--	1,4	--	2	1	1	≥16	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
102	9953	1	8	5	--	--	1	--	1	1	1	≥14	No
103	8318	1	4	5	--	--	1	--	1	1	1	≥18	No
104	4460	1	1	5	--	--	1,4	--	2	1	3	--	?
105	6046	1	4	5	--	--	1,3,4	--	1	4	2	≥18	No
106	3499	1	5	5	--	--	3	--	1	2	1	≥14	No
107	5644	1	11	5	--	--	1	--	2	5	1	≥12	?
108	15233	1	4	5	--	--	1,4	--	1	1	1	--	No
109	14191	1	9	5	--	--	1	--	2	3	1	≥12	No
110	656	1	8	5	--	5	1	3	1	--	--	--	No
111	7199	1	4	5	--	--	1	--	1	2	1	≥14	No
112	11206	1	1	5	--	--	1,4	--	1	5	2	≥8	No
113	110	1	11	5	--	--	1	--	1	4	2	≥16	No
114	3386	1	11	5	--	--	1,4	--	1	4	3	≥14	No
115	8036 70	2	1 4	5	--	4	1	3	1	2	1	≥18	No
116	11173 7024	2	3 2	5	--	--	1,4	--	1	1	1	≥24	No
117	14625	1	1	5	--	--	3	--	1	1	1	≥22	?
118	12319	1	11	5	--	--	1,3,4	--	1	1	1	≥12	E

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
119	14413	1	8	5	--	--	1,3	--	--	2	4	≥18	No
120	15096	1	9	5	--	--	1	--	1	1	1	--	No
121	10807	1	11	5	1	3	3,1,4	3	3	2	--	--	No
122	3118	1	11	5	--	--	3,1,4	--	1	1	1	≥14	No
123	2729	1	11	5	1	--	2	--	1	2	1	--	No
124	4814	1	11	5	1	--	1,3	--	1	2	1	≥12	No
125	13759	1	9	5	--	--	1,3	--	1	2	1	--	No
126	10817	1	11	5	--	3	1	5	3	2	--	--	No
127	12354	1	8	5	1	--	1	--	1	2	--	--	No
128	6329	1	1	5	1	3	1,3,4	3	3	2	--	--	E
129	12516	5	11	5	1	3	1	2	1	2	--	--	?
	5755		11										
	2579		5										
	1735		5										
	9		5										
130	8651	2	1	5	1	3	5,1,4	3	3	3	1	≥24	No
	8570		1										
131	4141	1	1	5	1	3	1	2	3	5	--	--	No
132	5396	1	6	5	1	--	1	--	1	1	1	≥20	No
133	979	1	10	5	1	--	1,2	--	--	2	2	≥12	No
134	7711	1	4	5	1	--	3	--	--	2	1	≥14	E

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
135	8648	1	2	5	1	--	3	--	1	1	1	12	No
136	12039	1	8	5	1	5	1	5	1	2	3	≥18	No
137	6709	1	4	5	1	--	4,1	--	1	4	3	≥16	No
138	13864 9867	2	3 1	5	1	3	3,2	3	3	1	2	≥16	I
139	3326	1	4	5	1	5	1	3	2	4	1	≥16	No
140	14686	1	1	5	1	--	3	--	1	2	1	≥8	No
141	14666 11409	2	1 2	5	1	3	1,4	3	3	5	--	--	No
142	7829	1	8	5	1	5	3,2	5	1	2	1	≥22	?
143	8534	1	1	5	1	--	3,1	--	2	2	4	≥22	No
144	12153	1	11	5	1	3	2	1	3	5	--	--	No
145	9918	1	1	5	1	3	1,4	3	3	4	1	--	No
146	15348	1	1	5	1	3	1	5	3	5	--	--	E
147	813	1	4	5	1	3	1,4	3	3	5	--	--	No
148	1571	1	10	5	1	3	1	3	--	2	--	--	No
149	6619 3579	2	4 4	5	1	--	3	--	1	4	1	--	No
150	12457 12076	2	8 3	5	1	3	1,3	3	3	--	--	--	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
151	9866	1	1	5	1	4	1	3	1	4	2	≥24	No
152	11072	4	4	5	1	3	1,3,4	5	2	4	2	≥28	?
	6536		4										
	3634		8										
	3324		4										
153	145??	5	?	5	1	3	3	3	2	2	1	16	?
	14106		1										
	13877		9										
	11664		9										
	8171		1										
154	6071	1	3	5	--	--	2,1	--	--	3	2	--	No
155	13528	2	1	5	--	9	1	5	2	1	2	≥20	?
	13382		3										
156	12402	4	8	5	1	5	1,3	5	2	1	1	≥18	E/I
	11966		11										
	11285		2										
	10588		1										
157	13857	6	10	5	--	3	3	3	3	5	--	--	No
	9698		1										
	8577		1										
	8412		10										
	7170		4										
	5995		5										
158	12116	2	3	5	--	3	3	3	3	5	--	--	No
	6090		3										
159	15175	5	9	5	1	1	1,4	5	--	--	--	--	No
	12943		8										
	9879		1										
	3731		1										
	248		9										

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
160	14621	3	1	5	1	1	3,1	5	--	--	--	--	No
	10134		1										
	4665		9										
161	8692	1	10	5	3	3	1,3	4	1	2	1	$\gtrsim$24	No
162	12890	1	1	5	3	5	1,3	5	1	2	1	--	No
163	12493	1	11	5	3	3	3,1	5	1	1	1	12	No
164	10851	1	9	5	1	3	1,3	1	3	--	--	--	No
165	8423	1	10	5	--	--	3,2	--	3	2	1	20	No
166	12	1	5	5	3	3	1	4	1	2	1	--	No
167	1992	1	5	5	3	--	1	2	1	2	1	$\gtrsim$20	I
168	10267	5	4	5	1	3	1	3	1	5	2	--	No
	9593		4										
	9469		4										
	6827		4										
	3334		4										
169	14264	6	4	5	1	5	4,1	3	1	2	1	$\gtrsim$20	No
	9264		4										
	3328		4										
	1911		5										
	1505		4										
	339		4										
170	14828	3	4	5	3	3	1,4	3	1	2	1	--	?
	8199		4										
	823		4										

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
171	14491	3	4	5	1	3	3,1	2	3	--	--	--	No
	4468		1										
	40		4										
172	10750	1	4	5	3	5	1,2	3	1	2	1	--	No
173	13988	4	4	5	3	5	1,2	3	1	2	1	$\geq$44	No
	9530		4										
	8189		4										
	6557		4										
174	13977	3	4	5	3	5	1,2	3	1	1	1	$\geq$18	No
	10256		4										
	3357		4										
175	13764	3	9	5	3	--	1,3	2	2	1	1	$\geq$36	No
	13141		3										
	10519		3										
176	13153	4	1	5	3	5	1,3	3	3/1	1	1	$\geq$24	No
	10586		1										
	9954		8										
	9915		1										
177	14439	8	1	5	3	5	1,3	3	3/1	1	1	$\geq$38	No
	14340		3										
	12118		3										
	9952		8										
	9703		1										
	7357		1										
	7116		10										
	4366		1										
178	9573	2	4	5	--	--	1	--	1	4	2	$\geq$20	No
	2528		4										

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
179	9724 4554	2	1 12	5	--	5	1,4	3	1	2	2	≥22	No
180	14441	1	1	6	--	--	1	--	1	4	1	≥18	No
181	1468	1	4	6	--	--	1	--	2	4	1	≥18	?
182	2373	1	4	6	--	--	1	--	2	4	1	≥20	No
183	3789	1	8	6	--	--	1	--	2	5	2	≥24	No
184	10597	1	1	4	--	7	1,4	3	1	2	1	≥14	E
185	14831	1	4	4	--	--	3	3	2	2	1	≥18	E
186	9164 2947	2	4 1	4	--	--	1,3	3	1	1	1	≥18	No
187	12057 3287	2	8 1	4	--	--	3,4	3	2	2	2	≥24	No
188	14798 12126	2	4 4	4	--	--	1	3	2	3	1	≥32	No
189	755 564	2	4 4	4	--	--	1	2	2	4	1	32	I
190	2714	1	11	4	--	6	1,4	3	1	2	3	≥24	?
191	14251 6639	2	4 4	4	--	6	1	2	1	2	2	≥26	No
192	14578	1	4	4	--	6	1	3	1	2	2	--	I
193	9598 7168	2	4 4	4	--	--	1,2	2	1	2	1	≥34	?

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
194	9423	2	4	4	--	--	4,3	3	1	2	2	14	?
	6847		4										
195	13532	2	1	4	--	8	1	3	2	1	1	≥18	No
	8960		11										
196	6707	1	4	4	--	--	4,3	3	1	2	1	--	No
197	11906	4	4	4	--	--	1,2,3	2	2	2	1	≥20	I
	10393		1										
	6613		4										
	6519		4										
198	12950	1	8	4	--	--	4,3	3	--	1	1	--	No
199	480	1	4	4	--	--	1,4,3	3	1	2	2	≥28	No
200	14667	1	1	4	--	8	1,4,2	2	2	1	2	≥16	No
201	2693	1	1	4	--	--	2,3	3	2	3	2	26	No
202	15066	2	9	4	--	--	1,3,4	3	1	1	2	≥26	No
	7899		8										
203	1248	1	4	4	--	--	4,3	2	1	4	1	≥14	No
204	1430	1	1	4	--	--	4,3	3	1	2	2	≥22	No
205	1366	1	4	4	--	--	4,2,3	3	2	2	3	16	I
206	11763	3	3	4	--	8	2,3	2	1	3	1	16	I
	4635		9										
	1208		1										
207	3692	1	4	4	--	--	3,4,1	3	1	4	1	≥12	No
208	5226	1	12	4	--	--	3,1	3	1	1	2	≥20	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
209	116	1	11	4	--	--	4,1	3	1	3	2	≥32	No
210	15344	1	1	4	--	--	3	2	2	2	1	28	E
211	490	1	4	4	--	--	4,1	3	--	2	2	≥18	No
212	8188	1	4	4	--	--	1	2	2	1	1	≥42	No
213	14811	1	4	4	--	6	1	2	1	1	1	≥14	E
214	12957	1	1	4	--	--	4,3	3	--	2	3	≥42	No
215	14364	1	4	4	--	--	4,3	3	1	1	1	18	No
216	10194	1	4	4	--	--	3	3	2	2	1	≥14	No
217	4794	1	8	4	--	--	--	1	1	1	2	≥12	I/E
218	6858 6515	2	4 4	4	--	--	2,3	4	2	2	1	≥28	No
219	73	1	4	4	--	7	3,4,1	3	1	2	1	20	?
220	4232	1	1	4	--	--	3	3	2	2	2	≥30	No
221	9425	1	4	4	--	--	1	2	2	1	2	≥28	I
222	13594	1	4	4	--	--	1,2	1	2	2	1	≥28	No
223	12787	1	11	4	--	--	1,2	4	1	1	1	≥34	No
224	14301	1	4	4	--	6	3,4	3	1	2	2	13	E
225	6696	1	4	4	--	--	4,3	3	1	2	2	≥14	No
226	11572 6248	2	4 4	4	--	--	3,2	3	1	2	1	≥40	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
227	9743	1	1	4	--	--	1	1	2	4	1	≥14	No
228	4098	1	3	4	--	--	1,3	1	1	1	1	≥24	E
229	13871	1	3	4	--	--	1,2	1	1	1	1	≥20	No
230	12890	4	3	4	--	--	4,1	3	2	2	2	32	No
	12190		1										
	10601		1										
	8660		1										
231	11053	1	4	4	1	8	1,2	1	2	2	1	12	No
232	15015	3	4	4	--	7	1	3	1	2	1	21	?
	8017		4										
	1504		4										
233	14760	3	4	4	--	7	3,2	1	1	1	1	≥16	No
	3337		4										
	2408		4										
234	14202	2	9	4	--	--	1,3	2	2	1	2	18	E
	8562		1										
235	9193	1	6	4	--	--	1,3,4	5	1	2	1	16	E/I
236	8791	1	1	4	--	--	3,2	2	1	2	2	≥14	E
237	3150	2	11	4	--	--	1,4,3	3	1	2	2	≥30	?
	144		11										
238	8850	2	2	4	--	--	2,1	2	1	1	1	28	E
	3968		8										
239	10518	1	3	4	--	8	2,1	2	2	1	1	13	E

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
240	14769	4	4	4	--	--	1,4,3	3	2	1	1	≥28	No
	13638		4										
	9434		4										
	340		4										
241	2578	2	5	4	--	--	4,3	3	2	1	2	≥20	No
	2121		5										
242	986	1	1	4	--	--	2,3	3	2	1	1	--	No
243	3955	2	8	4	--	--	1	2	2	1	3	17	No
	2494		8										
244	2946	1	1	4	--	--	2	1	2	1	1	--	No
245	7952	2	8	4	--	--	4,1	5	2	1	1	≥16	No
	1280		10										
246	12327	3	8	4	--	--	1,3	3	1	2	4	--	No
	10714		6										
	8333		4										
247	14569	1	10	4	--	--	1,4	2	2	3	1	≥24	No
248	2244	1	11	4	--	--	4,1	3	2	3	1	18	No
249	8649	1	1	4	--	--	3,4	3	2	2	2	18	No
250	1754	2	7	4	--	--	3	3	1	1	1	22	I
	941		3										
251	5697	1	5	4	--	--	1	2	2	1	2	≥26	No
252	11399	1	5	4	--	--	1,4	2	1	1	2	--	No
253	14165	1	4	4	--	--	1,4	3	--	1	1	≥44	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
254	10024	1	9	4	--	--	3	3	1	1	1	12	No
255	10749	1	4	4	--	--	1,2	1	2	2	3	≥36	No
256	11395	1	5	4	--	--	1	2	1	3	2	≥38	?
257	8413	3	10	4	--	--	1,4,3	3	1	2	1	16	No
	11006		2										
	8853		2										
258	12091	2	8	4	--	--	1,4	3	2	4	1	--	No
	12019		11										
259	14142	1	4	4	--	--	3,2	1	1	1	1	26	No
260	4427	1	1	4	--	--	2,3	2	2	1	3	18	?
261	5127	1	1	4	--	--	1,3,4	3	2	1	1	≥14	No
262	457	1	4	4	--	--	1	3	2	1	1	≥16	No
263	562	1	4	4	--	--	1,4	3	2	2	1	16	?
264	14066	1	4	4	--	--	4,3	3	1	2	1	≥44	No
265	15364	1	1	4	--	--	1,3	2	1	1	3	18	?
266	7095	1	10	4	--	--	1,4	3	--	2	1	--	No
267	15037	1	11	4	--	--	1,4	3	2	2	1	--	No
268	6736	1	4	4	--	7	1,4,3	3	1	2	1	≥14	No
269	4279	1	1	4	--	--	1,4	3	2	4	1	16	No
270	8544	2	1	4	--	--	1,3	3	1	1	1	≥16	No
	3207		1										

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
271	3911	2	10	4	--	--	1,4,3	3	2	2	1	≥30	No
	1848		11										
272	15404	2	4	4	--	--	1,3	3	1	2	2	16	E
	14399		4										
273	15412	2	5	4	--	--	1,3	3	2	2	1	14	?
	1892		5										
274	15085	3	9	4	--	--	1,4	3	2	1	2	16	I
	9058		1										
	7566		1										
275	5574	2	12	4	--	--	1,4,3	3	1	2	2	24	?
	1656		1										
276	14304	3	4	4	--	7	4,3	3	1	2	2	22	No
	14250		4										
	11905		4										
277	8016	1	4	4	--	8	1,3	2	2	1	1	17	?
278	13408	3	3	4	--	8	1,2,4	1	2	4	1	--	No
	4277		1										
	993		1										
279	8805	1	1	4	--	--	1,3,4	3	2	2	1	≥24	No
280	14547	3	4	4	--	--	1,2	1	1	2	1	≥14	No
	8354		3										
	368		4										
281	5216	1	4	4	--	--	2,1	1	--	3	2	--	?
282	?	1	?	4	--	--	1,4	3	1	1	3	≥24	No
283	4995	1	12	4	--	--	2,1	1	1	1	1	≥12	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
284	12946	1	8	4	--	--	2	1	2	1	2	$\gtrsim$18	I
285	6352	1	1	4	--	--	3	3	2	2	1	$\gtrsim$12	No
286	20	1	12	4	--	--	1,2,4	2	1	4	1	$\gtrsim$14	No
287	11416	2	4	4	--	8	3	2	2	1	3	16	E
288	12507	2	11	4	--	--	1,3	3	1	1	2	--	?
	5684		5										
289	11602	3	4	4	--	--	1,4	1	1	1	1	$\gtrsim$18	?
	8323		4										
	485		4										
290	12903	3	8	4	--	--	1	3	1	2	2	--	No
	6748		4										
	5246		4										
291	14592	6	4	4	--	--	1	1	2	4	1	$\gtrsim$16	No
	12138		4										
	7571		4										
	3130		11										
	1466		4										
	1271		4										
292	10501	5	4	4	--	--	3,4	3	2	1	1	46	I
	3643		8										
	3581		4										
	1497		4										
	1433		1										
293	14293	6	4	4	--	7	1,3,4	3	1	1	2	32	No
	11564		4										
	10731		4										
	6556		4										
	1623		4										
	1324		7										

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
294	12478	7	8	4	--	--	3,1	3	1	2	1	--	?
	11861		4										
	10624		4										
	7568		1										
	6911		4										
	4407		1										
	242		11										
295	6691	2	4	4	1	8	3	5	2	2	1	16	I
	61		4										
296	14102	1	1	4	--	8	3	3	2	1	1	16	No
297	8	1	5	4	--	--	1	3	2	2	1	≥24	I
298	14710	1	4	4	--	--	1,3	3	--	1	5	--	No
299	1843	1	11	4	--	--	3,4	3	1	1	1	≥28	No
300	14578	1	4	4	--	8	2	1	2	4	2	--	?
301	14699	1	1	4	--	--	2	1	2	2	5	≥22	No
302	9832	1	5	4	1	8	1,2	2	2	2	1	--	I
303	8432	1	10	4	--	--	3	3	2	1	1	15	No
304	6082	1	3	4	--	7	3	3	1	2	2	≥24	No
305	13386	1	3	4	--	--	3	5	3	1	1	14	No
306	15211	1	3	4	--	--	3	3	2	2	1	≥16	No
307	·4060	1	3	4	--	--	1	3	1	4	1	--	No
308	15210	1	3	4	--	--	3	3	1	3	2	10	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
309	14457	12	1	4	1	8	1,4	3	2	4	1	≳30	?
	13297		3										
	13115		3										
	12290		3										
	11104		4										
	9899		1										
	9621		9										
	8389		9										
	7957		8										
	3432		3										
	2626		1										
	275		8										
310	4543	1	3	4	--	--	2	1	1	2	2	≳10	I
311	11278	4	2	4	--	7	1	3	1	1	2	26	I
	11288		2										
	7854		8										
	1752		7										
312	11298	2	2	4	--	--	3,4	3	1	2	1	14	No
	3474		2										
313	15197	3	3	4	--	--	1	4	1	1	2	≳24	E
	10944		3										
	2465		8										
314	8662	4	1	4	2	--	3,4	3	2	2	1	18	No
	4521		3										
	1581		1										
	581		4										
315	10420	1	1	4	--	--	3,4	2	2	1	1	≳22	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
316	14276	6	4	4	--	--	1,4	3	2	5	2	22	?
	13590		4										
	6857		4										
	6040		4										
	2393		4										
	2403		4										
	464		4										
317	4778	1	12	2	--	8	1	3	2	4	1	≳44	E/I
318	612	1	3	2	--	--	1,4	3	1	1	1	≳14	E
319	10956	2	3	2	2	--	3,1,4	5	1	1	2	≳12	No
	9222		1										
320	11009	2	2	2	2	--	1	3	1	2	2	≳14	No
	10917		9										
321	12632	1	3	2	2	--	1	2	2	2	1	≳12	No
322	14657	3	9	2	2	--	4,1,3	3	1	2	1	≳22	?
	11762		3										
	8759		1										
323	6330	2	1	2	2	--	4,3,1	3	1	2	1	14	?
	2426		1										
324	13921	1	11	2	2	--	1	3	1	2	1	≳28	I
325	6268	1	4	2	--	--	3	3	2	2	1	≳22	No
326	4011	2	10	2	--	8	1,3	2	2	1	2	≳14	No
	346		4										
327	2804	1	5	2	2	--	1	3	1	2	2	42	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
328	12044	4	8	2	2	--	3,1	3	1	2	1	$\gtrsim$30	I
	5344		11										
	7840		8										
	4819		11										
329	11738	2	4	2	2	--	1,3	3	1	2	2	$\gtrsim$30	I
	9000		4										
330	11641	6	4	2	--	6	2	1	2	5	2	11	I
	8788		12										
	1555		4										
	1239		4										
	681		4										
	673		4										
331	924	1	3	2	--	--	4,1	3	1	2	2	--	?
332	13266	1	10	2	--	--	3,2	2	1	4	1	$\gtrsim$14	E/I
333	3482	1	5	2	--	--	3	5	1	2	2	22	I
334	8023	1	4	2	--	8	3	3	2	2	4	$\gtrsim$16	?
335	12458	1	8	2	2	7	3,4,1	3	1	1	1	16	?
336	12812	1	3	2	--	--	1,3	2	2	2	2	$\gtrsim$20	No
337	13384	1	3	2	--	--	1,4,3	3	2	2	1	--	No
338	13390	1	3	2	2	--	1,3	2	1	1	1	$\gtrsim$12	No
339	11301	1	2	2	--	--	3,4	5	2	2	2	$\gtrsim$22	No
340	10076	1	1	2	--	--	1	3	2	2	2	11	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
341	14082	4	9	2	--	8	3,1	3	2	2	1	≥16	No
	11257		3										
	10869		9										
	271		8										
342	10603	3	1	2	--	8	3,2	5	2	2	2	40	No
	10572		1										
	9949		8										
343	15103	4	9	2	--	--	1,3	3	2	1	1	26	No
	11938		3										
	10834		11										
	9950		8										
344	15070	6	9	2	--	--	1,4	3	1	1	1	≥16	I
	14930		1										
	12179		1										
	9951		8										
	4629		9										
	2713		11										
345	15393	4	4	2	2	--	1	2	1	2	1	18	I
	8320		4										
	1392		4										
	41		4										
346	12181	3	1	2	--	--	3,1	3	1	2	2	36	No
	9707		1										
	3786		8										
347	8694	1	10	2	--	--	1	2	1	4	1	20	E
348	4365	1	1	2	--	--	3,1	3	1	1	1	≥24	No
349	9751	1	1	2	--	--	1	2	1	2	2	--	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
350	12926	8	8	2	--	8	2	3	2	3	2	14	E/I
	12441		11										
	9628		9										
	7359		1										
	2951		1										
	1022		4										
	324		1										
	14		11										
351	9745	1	1	2	2	--	1,4	2	1	2	1	16	No
352	12110	1	3	2	2	--	3,1	3	1	1	2	≥24	?
353	7215	1	4	2	--	--	4,3	3	2	2	1	10	?
354	580	1	4	2	--	--	3	3	1	2	1	≥14	No
355	4385	1	1	2	--	--	3	3	2	1	1	15	?
356	7479	2	8	2	2	--	4,3	3	1	1	1	≥30	?
	3730		1										
357	927	1	3	2	2	--	1,4	4	1	2	1	≥18	No
358	4503	1	9	3	--	--	1	2	1	2	2	12	No
359	12748	1	4	3	--	--	3	2	1	2	2	≥20	No
360	6569	1	4	3	--	--	5,1	2	1	2	1	≥16	No
361	10967	1	3	3	--	--	4,1	3	1	2	1	≥16	No
362	7043	1	2	3	--	--	3	3	2	2	2	≥20	No
363	2819	1	5	3	--	--	3	3	2	1	1	24	No
364	9871	1	1	3	--	--	1	2	1	4	1	15	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
365	15355	1	1	3	--	--	4,1	5	2	2	1	12	E
366	9704	1	1	3	--	--	1,4	5	2	1	1	≥18	No
367	5490	1	12	3	--	--	1,2,3	4	1	2	1	≥12	No
368	12313	1	11	3	--	--	4,3	3	2	2	1	18	No
369	7358	1	1	3	--	--	3	3	2	2	1	--	No
370	7396	1	4	3	--	--	1,2	1	1	2	2	16	No
371	4929	1	12	3	--	--	3,4	5	2	1	2.	26	I
372	14020 7591	2	4 4	3	--	--	3	3	2	2	1	22	I
373	14260 715	2	4 4	3	--	--	3	3	2	2	1	30	I/E
374	11017 2463	2	2 8	3	--	--	1	3	2	2	2	18	?
375	12562 12332	2	11 11	3	--	--	2,1	1	2	2	1	22	E
376	12977 8796	2	1 1	3	--	--	1,3,4	3	2	2	1	--	E
377	12934 4389 3278	3	8 1 1	3	--	--	1	3	1	1	1	20	?
378	11142 7794 7511 7175	4	4 4 4 4	3	--	--	4,3	3	1	2	1	≥16	?

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
379	14513	10	1	3	--	--	1	2	2	2	2	24	?
	13685		9										
	12426		11										
	8858		2										
	7692		1										
	6409		1										
	5100		1										
	4802		3										
	4458		1										
	1381		10										
380	7112	1	10	3	--	--	1	3	1	1	1	14	No
381	10472	2	6	3	--	--	3,1	2	1	5	2	--	?
	9299		6										
382	13809	2	1	3	--	--	3,4	3	2	2	1	--	No
	7822		4										
383	1114	1	1	3	--	--	1,4	3	1	2	1	≥12	?
384	6376	1	1	3	--	--	1,4	3	1	2	1	≥22	No
385	15250	1	4	3	--	--	1	3	1	2	1	≥18	?
386	6356	1	1	3	--	--	3,1	3	2	2	1	≥16	No
387	10383	1	1	3	--	--	3,4	3	2	2	1	16	No
388	3838	1	11	3	--	--	1	3	1	2	1	--	No
389	13694	4	4	3	--	--	3,4	3	2	3	1	16	No
	11729		4										
	3674		4										
	1556		4										

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
390	13633	8	4	3	--	--	3,4	3	2	1	1	≥26	?
	11595		4										
	11570		4										
	11108		4										
	10378		4										
	8987		4										
	7216		4										
	3101		4										
391	13825	1	3	3	--	--	4,3	3	1	2	2	--	?
392	10703	1	11	3	--	--	3	3	1	5	2	--	No
393	520	1	8	3	--	--	1,4	1	1	5	2	--	No
394	14365	1	4	3	--	8	3,4,1	3	2	2	--	--	?
395	12536	1	11	3	--	--	1,2	4	--	1	1	--	?
396	9291	1	10	3	--	--	1,4	3	1	2	1	≥20	No
397	?	1	?	3	--	--	3,4	3	--	1	1	≥44	No
398	13441	1	9	3	--	--	4,3	3	1	1	1	14	No
399	920	1	3	3	--	--	1,4	2	2	2	1	≥10	No
400	4416	1	1	3	--	--	1,4	2	2	5	2	≥16	No
401	1585	1	1	7	2	--	3,1	5	2	1	2	18	E
402	1367	1	4	7	2	--	1	1	1	1	1	≥28	No
403	6257	1	4	7	2	--	3,4	3	--	2	1	10	No
404	8205	1	1	7	2	--	3	3	1	1	1	≥12	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor, Tech.	Type	Shape	Temp. Mat	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
405	6093	1	3	7	--	--	4,1	3	1	2	1	≥10	?
406	10457	1	4	7	--	--	3	3	--	4	1	--	No
407	8909	3	11	7	2	8	4,1	3	2	2	4	21	?
	2200		1										
	43		1										
408	8871	3	2	7	3	8	2,3	3	2	2	1	≥14	I
	6073		3										
	5435		12										
409	9417	5	4	7	3	8	1	3	2	5	2	8	?
	9118		4										
	9090		4										
	8992		4										
	1616		4										
410	9018	1	1	2	--	--	1	3	1	2	1	≥40	No
411	9735	1	1	2	--	--	1,3	3	1	2	2	≥46	No
412	5269	1	12	2	2	--	1,3,2	2	1	2	1	10	No
413	12644	1	4	2	--	--	3	4	2	2	1	20	I
414	1470	1	1	2	--	--	3,1	2	2	1	1	32	No
415	3580	1	4	2	--	--	1	3	1	2	2	≥32	?
416	2929	1	1	2	2	8	1,4,3	3	2	2	3	17	?
417	10431	1	1	2	--	--	3	3	1	1	1	≥20	No
418	10911	1	9	2	--	--	3,1	3	--	2	1	--	No
419	5405	1	11	2	--	--	1	5	1	2	1	18	No

APPENDIX II (continued)

Vess. No.	Cata. No.	No. of Sherds	Analyt. Prov.	Decor. Tech.	Type	Shape	Temp. Mat.	Temp. Size	Rim Orien.	Rim Shape	Lip Form	Diam.	Soot
421	3329	1	4	2	--	8	1,3	2	2	2	--	--	?
422	12756	5	4	2	2	5	1,3,4	3	--	--	--	--	E/I
	7394		4										
	3696		4										
	689		4										
	425		4										

Appendix III

STATISTICAL FORMULAE

Following the format of Fields (1981), this section presents the formulae used in the distribution of vessel batches to generate chi-square tables. The formulae are from Blalock (1972:285, 287) and Thomas (1976:265). Significant chi-square values are provided in Thomas (1976:498-499).

Formulae

1) Chi-Square (X^2) = $\sum \frac{(\text{observed frequency} - \text{expected frequency})^2}{\text{expected frequency}}$

2) Expected Frequency = (column total x row total) ÷ grand total

3) Degrees of Freedom (df) = (r - 1) x (c - 1)

   r = number of rows

   c = number of columns

4) Pearson's contingency coefficient (c) = $\sqrt{\frac{X^2}{X^2 + N}}$

   N = total sample size

5) Yates' Correction for Continuity consists of adding or subtracting .5 from each observed frequency to reduce the differences between the observed and expected frequencies.

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